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TECHNICAL EDUCATION (FRANCE).

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REPORT TO THE SCIENCE AND ART DEPARTMENT
ON RECENT PROGRESS
OF FRENCH TECHNICAL EDUCATION.

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1. RECENT LEGISLATION ON PRIMARY TECHNICAL INSTRUCTION
IN FRANCE.

The State organisation of Primary Technical Instruction in France owes its original inception to a discussion in the Chamber of Deputies in January 1878. The results of French industry, as displayed in the Paris Exhibition of that year, were held to be unsatisfactory. Chambers of Commerce and leading manufacturers had for years past urged upon the Government the necessity of taking measures to arrest the gradual decline of technical skill which was due to the very unsatisfactory conditions attending ordinary apprenticeship in the workshops, and which was seriously affecting the interests of the country. It was now proposed that a special grant should be made to the Ministry of Agriculture and Commerce for the purpose of creating a complete system of primary technical instruction which would comprise a technical school in each Department under the immediate supervision of the Conseil général, or County Council. This proposal, which involved the idea of assigning a special and independent position to technical education, and was, largely on this account, an unpopular one, was defeated. A counter proposal was made to "annex" technical or primary instruction, or, in other words, to graft new technical schools on existing elementary ones. This project was, with some modifications, accepted, and finally, after considerable delay, an agreement was entered into by the Ministry of Public Instruction on the one hand and the Ministry of Agriculture and Commerce on the other, which resulted in the Law of the 11th of May 1880.

The effect of the main provisions of this law was:—

- (1.) To create a new and distinct order of schools, under the name of Écoles Manuelles d'Apprentissage. This somewhat ungrammatical title was, at the time, a good deal criticised, but was, it was thought, intended to designate a class of school which aimed at providing general technical instruction, and not an apprenticeship to any definite trade. Their object, as defined by the law itself, was "to develop in youths "intended for manual trades the requisite dexterity and technical "knowledge." In a decree of January 1887, they are said to be

- intended "to develop technical skill and to complete, in a special direction, the instruction of the elementary school."
- (2.) In the second place the law of 1880 assimilated to the above Écoles d'Apprentissage those higher grade primary schools which comprised courses, or classes, for technical instruction.
 - (3.) It placed both the above kinds of school in the general category of "primary schools," and thereby made the expenditure in connection with them obligatory on the commune or the department.
 - (4.) It placed the Écoles d'Apprentissage, and the schools assimilated to them, under the dual control of the Ministers of Public Instruction and of Agriculture and Commerce respectively.

In July 1881 an administrative order, intended to give effect to the above law, practically made it a dead letter. It established a distinction between the two kinds of school which the law itself had expressly united, and it, moreover, separated the functions of the two Ministers. The Minister of Agriculture and Commerce was made financially responsible both for the erection and the annual expenditure of the Écoles d'Apprentissage, regardless of the fact that no grant had been made to his department for that purpose. The consequence of this blunder was that from 1880-1888 it was impossible to found a single public school of the kind. The law of 1880 was, therefore, so far as the Écoles Manuelles d'Apprentissage are concerned, never carried out. This fact was admitted in the French Senate during the discussion of the Budget of 1887.

In response to the renewed appeals of various municipalities, a Commission was appointed in February 1886 for the purpose of considering the best means of giving practical effect to the law of 1880. After hearing a good deal of conflicting evidence on the rival claims of primary and technical instruction, the Commission at length succeeded in effecting a compromise which took practical shape in the decree of the 17th of March 1888. This decree forms the basis of the agreement which still exists at the present time between the two Ministries. It applies only to the schools subject to the law of December 1880, i.e., the Écoles d'Apprentissage and the Écoles Primaires Supérieures Professionnelles, or technical higher grade schools. Moreover, it confirms the principle of dual control established by the law of 1880, and places all the schools subject to that law under the joint authority of the two Ministries. The cost, both of the Écoles d'Apprentissage and of the Écoles Primaires Supérieures Professionnelles, is to be defrayed, partly by the Ministry of Public Instruction, and partly from the budget of the Department or of the Commune according as the school is departmental or communal. No charges of any kind are to be incurred in connection with these schools by the Ministry of Commerce, which may, however, make, within the limits of its resources, such voluntary grants as it may from time to time deem advisable.

Every school subject to the law of 1880 is governed by a school council, which, in the case of a commune, consists of the Mayor as President, two Municipal Councillors, three members chosen by the Municipal Council from amongst local manufacturers, and, finally, a representative of each Ministry. It is the duty of the council to watch over the material interests of the school, to prepare the budget in conjunction with the Principal, and to draw up, subject to ministerial approval, the syllabus of work. In the case of the Écoles Primaires Supérieures Professionnelles, as distinguished from the Écoles d'Apprentissage, a second additional body, the Comité de patronage, was instituted, which may, however, take the place of a council. The members of the Comité de patronage are appointed by, and are absolutely subject to the influence of the Ministry of Public Instruction. To the same Ministry belongs

the initiative in appointing the principals and teachers of all primary technical schools, of whatever kind, with the exception of national schools. Such appointments, however, require confirmation by the Ministry of Commerce. In the case of national schools, like Vierzon, Voiron, and Armentières, appointments can only be made conjointly, the initiative belonging to neither Ministry. The joint authority of the Ministry of Commerce extends only to those higher grade primary schools and Cours Complémentaires (higher grade classes attached to a primary school), which prepare directly for commercial or industrial life. Schools in which there is no technical element, or in which it is considered quite subordinate remain, as before, under the sole authority of the Minister of Public Instruction.

Boys cannot enter either class of school before 12 years of age. Between the age of 12 and 13 they must be able to show a Certificat d'études primaires; after 13 years of age they are allowed, in lieu of this, to pass an entrance examination.

All schools are, in theory, obliged to conform to a syllabus of work laid down by the two Ministries. They may, however, be authorised to draw up a special programme adapted to the needs of the school.

In both classes of school the duration of the course is, except in special cases, three years. In some schools there is a fourth year, which is subject to a special syllabus.

Schools may prepare either for commercial or industrial life only, or for both concurrently. The special character of the school is, in the case of communal schools, decided by the Municipal Council. In industrial schools the obligatory technical subjects are handicraft, drawing, science, and technology; in commercial schools, book-keeping and business routine, commercial geography, modern languages, and drawing.

Every industrial school must possess at least one foreman or manager, who is expressly included by the regulations amongst the teaching staff. His technical qualifications must be attested by the Council of the school, and he is selected by the Mayor from a list of three names submitted by the Council.

The following is the official syllabus laid down for industrial and commercial schools:—

	Hours a Day.		
	1st Year.	2nd Year.	3rd Year.
INDUSTRIAL SCHOOLS.			
Primary instruction - - - - -	2	2	2
Manual work - - - - -	3	4	5
Drawing - - - - -	1	1	1
Science and technology - - - - -	1	1	1
Meals, &c. - - - - -	2	2	2
	9	10	11
COMMERCIAL SCHOOLS.			
Primary instruction - - - - -	1	1	1
Book-keeping, &c. - - - - -	2	3	3
Commercial geography - - - - -	1	1	1
Foreign languages - - - - -	2	1	2
Drawing - - - - -	1	1	1
Meals - - - - -	2	3	3
	9	10	11

Such is the outline of a scheme of technical instruction under the two Ministries. Sufficient time has now elapsed to enable an opinion to be expressed as to results achieved. The project of establishing a distinct order of *Écoles Manuelles d'Apprentissage* had up to 1888 been a failure, and though the Ministry of Commerce was now relieved from any direct financial responsibility in connexion with them, they met with no better success. On the other hand, the *Écoles Primaires Supérieures Professionnelles*, which were to have been "assimilated" to these schools, have developed considerably since 1880. It may, however, be confidently affirmed that, so far as the real interests of technical education are concerned, they have failed to fulfil the task assigned to them. Where comparative success has been achieved, this is due to special local effort, not to State regulations. In the great majority of cases the bias of these schools is towards a general education of a totally indefinite character, and not, as the law of 1880 intended, towards distinctly industrial teaching. In theory "Professionnel," they are, in most cases, merely ordinary higher grade schools. The smattering of technical instruction which they provide is nothing more than an "extra." A charge now frequently brought against these schools by competent authorities in France is that, as a rule, they only succeed in turning out "*Déclassés*," youths who "*se croient des savants*," and who become useless members of society. It is by no means easy to ascertain the exact part which manual work plays in the curriculum of these schools, for the syllabus of work presented on demand may fail to tally with the facts. I have, however, repeatedly been assured on good authority that in some schools not more than four hours a week are devoted to the workshop, an amount of time which is considered useless for practical purposes. The minimum number of hours, which, in the opinion of the best French authorities, is sufficient to prepare boys for future apprenticeship in trade workshops is 25 to 30 hours a week, and this must be continued for at least three years. If to this be added the time required for the scientific side of technical instruction, it must be evident that not much leisure is left for a "literary" education.

The defects of a system in which two Ministries of divergent tendencies exercise a joint control over technical education are obvious, and now generally admitted. Its establishment was due to the initial error of under-estimating the task which technical education has to accomplish, and of viewing the latter only in the light of a complement of general education. It is beginning to be recognised that the relative claims of the two do not admit of any compromise based on abstract principles, and that, unless a definite standard of efficiency is attained, technical education misses the main purpose for which it was instituted. This standard of efficiency must not be set by academic considerations of general culture, but by the exigencies of modern competition in trade. No good results could be expected from the ill-assorted union of two Ministries which, though nominally equal, in reality occupy the position of superior and dependent, or from a compromise in which a new and important State interest is practically regulated by a powerful organisation, whose knowledge and whose sympathy are both inadequate to the task. The present tendency of opinion in France is in favour of ending a union which has proved so unfruitful, and of recognising that, while technical instruction must necessarily be based on elementary education, it must also enjoy an independent status of its own.

The combined agency of the two Ministries, which has, on the whole, been so unproductive, is nevertheless entitled to claim one success. This consists in the foundation of the three national technical schools of Vierzou, Voiron, and Armentières. The law of December 1880 did not in itself provide for the foundation of State schools for primary technical instruction. A Commission

was, however, appointed in May 1881 by the Minister of Public Instruction, in agreement with the Minister of Commerce and Industry, to examine the question of organising a State school, which was to unite higher grade elementary with technical instruction, and which was to serve as a model to the communes and departments which desired to found schools of the order specified by the law of 1880. The Commission expressed themselves in favour of creating, not merely an *École d'Apprentissage*, but one which would, in one and the same establishment, combine a school for very young children (*École Maternelle*), a primary and an higher elementary technical school. The Commission was further of opinion that "all specialisation in manual instruction should be avoided." Before the report of the Commission was officially presented the decree of the 9th July 1881, issued at the instance of the two Ministries, directed the creation of a "National School of Higher Elementary and Technical Instruction intended to serve in preparation for "apprenticeship" (*École nationale d'enseignement primaire supérieur et d'enseignement professionnel préparatoire à l'apprentissage*). The school at Vierzon was designed "as a pattern for similar establishments," to be founded in execution of the law of 1880. Two further schools of the same kind were created at Armentières and Voiron by the decrees of the 10th and 26th July 1882. Finally, the decree of the 17th March 1888 provided for the future foundation and regulation of other schools of the same class. The school at Voiron was opened in 1886, those at Vierzon and Armentières in 1887. A report of M. Buisson, Director of Primary Instruction, defines the purpose of these three schools as follows:—"Vierzon, Voiron, and Armentières are not, in any sense, special technical schools, more or less complete schools of engineering (*Écoles d'Arts et Métiers*); they are associations of schools comprising an infant and a primary elementary school, and at each stage technical instruction which, commencing from the earliest age, when it is of little importance, continues up to the very end of the course, when it becomes of the first moment. When he has arrived at this final stage, the apprentice, who now only needs the practice of his trade to become a workman, leaves the national school and goes either into a workshop or into a technical school, in the proper sense of the term. Hence these three establishments provide a general preparation for artisan and industrial life. They lead a youth right up to the threshold of the factory or the engineering school, armed with every kind of general and special knowledge, with the aptitudes and habits of work which will enable him either to select a particular calling, or, if needs be, pass from one calling to the other, sure of being after a few months of practice a finished workman." It need hardly be said that this rather highly-pitched statement is in want of some modification. Even the best pupils of primary technical school require, I believe, a year or two before they can be considered masters of their craft.

The number of these schools is at present still limited to three. The Directors, as well as the whole staff, are appointed in common by the two Ministries. The three establishments each comprise—(1) an infant school (age 3 to 7), to which only boys are admitted; (2) an elementary school; (3) a higher elementary technical school. There is some manual work even in the primary school, but of the most rudimentary kind, intended to develop quickness of hand without entailing physical effort. The work in the shops begins at 12 or 13 years of age, when the children enter the higher grade school. In the first year it occupies three hours a day; in the second year, four hours; in the third year, five hours. In the first year there is no specialisation; five months are spent in the joiner's shop and five in the fitter's. At the beginning of the second year a selection is made of some

special branch of trade, according to the aptitude of the boy or the wishes of his parents. From this time forward he works at carpentering or modelling, turning in wood, fitting, turning in metal, or (as at Armentières) weaving. From the second year, when the specialisation begins, the work done bears an immediate relation to the special trades of the district in which the schools are situated; working in iron and painting on pottery at Vierzon; working in paper, linen, and silk at Voiron; working in iron, modelling and weaving at Armentières. Each school provides special preparation for the *Écoles d'Arts et Métiers* and for naval engineering. The instruction is gratuitous for day pupils; boarders pay 500 francs per annum. Boys cannot enter the school before 12 years of age, and they must be able to show a *Certificat d'études primaires* or pass an equivalent entrance examination.

The above schools may be regarded as representing the highest ideal formed by the French State of a combined general and technical education. They stand as the official solution of a difficult, if not insoluble, problem. In view of the general failure which has attended the joint efforts of the two Ministries, their success may appear to require some explanation. This is, no doubt, largely to be found in the presence of three factors which are absent in the great majority of higher elementary technical schools: the *cachet*, which a State institution always possesses in the eyes of a French parent; the absence of municipal control, and, lastly, in the avowed predominance of technical instruction. The prospectus of the school at Armentières is careful to point out that "this school, of which the staff is appointed by the Minister of Public Instruction, with the assent of the Minister of Commerce and Industry, is distinguished from ordinary schools by the ampler opportunities which it affords for learning the use of tools as well as the nature and management of machinery, for practical exercises in drawing and modelling, and for chemical experiments. It is no less distinguished from apprenticeship schools by the range and the intrinsic excellence of its syllabus of work. It forms skilful and capable workmen, and able foremen and managers who form the élite of the working population."

We have now reached the extreme limits of the concerted action of the two departments, and we may notice that technical instruction is already in the ascendant. In the next stage the Ministries part company, and the Ministry of Commerce and Industry for the first time takes an independent line of its own. Though the agreement of March 1888, between the two Ministries, nominally gave them a joint share in the control of the *Écoles d'Apprentissage* and the *Écoles Primaires Supérieures Professionnelles*, yet practically the provision in that agreement, which laid the cost of these schools exclusively on the Ministry of Public Instruction, deprived the Ministry of Commerce of any real power of intervention. The action of the latter was virtually limited to tendering advice. The further provision, on the other hand, which rendered it necessary that every detail of organisation should have been jointly approved of by the two Ministries was the cause of constant friction and delay. These serious defects were at last rectified by the insertion in the financial law of January 26, 1892, of a clause which created an entirely new category of schools under the name of *Écoles Pratiques de Commerce ou d'Industrie*. The creation of these schools may, if we except the National Schools of Vierzon, Voiron, and Armentières, be regarded as the first serious step which the French State has taken in the direction of primary technical education. The best proof of a consciousness that the policy of 1880 and 1888 had been a failure is afforded by the official language in which the new project was introduced. It almost suggests that the subject of primary technical instruction is now being mooted for the first time. The evils

lamented in 1878 remain, apparently, unabated after an interval of 14 years. In two circulars, dated June 1893, and addressed to prefects of departments and directors of schools, the Ministry of Commerce and Industry calls attention to the fact that the law of January 26, 1892, placed under the control of his department those Écoles Primaires Supérieures Professionnelles in which the instruction is principally industrial or commercial, and gave them the title of Écoles Pratiques de Commerce ou d'Industrie. "There is," the circular states, "an essential distinction between those newly-created Écoles "Pratiques and those Écoles Primaires Supérieures in which a certain amount of attention is given to technical (professionnel) instruction as a preparation for apprenticeship. The Écoles Pratiques are intended to do more than this, viz., to form clerks (employés de commerce) and workmen whose services can be at once utilised in the counting-house and the workshop. The value of a general education, both for its own sake and as a necessary basis for technical knowledge, is of course incontestable. No one would desire to banish it from the Écoles Pratiques, which will include some primary instruction, and into which no boy will be admitted who has not fulfilled the conditions imposed by the Compulsory Education Bill of March 1882. On the other hand it is essential that special provision should be made at the present time for the requirements of industry and commerce. The keenness of international competition has revolutionised the conditions of trade. The wholesale use of machinery and the minute subdivision of labour has practically extinguished apprenticeship in the workshop. Yet, in view of the constant changes to which machinery is subject, it is evident that there never was a time when it was so requisite that workmen should possess scientific knowledge, and should be thoroughly versed in all the requirements of the workshop. It is the special aim of the École Pratique to fill the void which now exists both in commerce and in industry."

The Bill of 1892 contains the following provisions:—A special council (Conseil de perfectionnement) is to be elected for each school. The Director of the school is, however, not subject to this council, but is directly responsible to the Minister himself. His authority extends over every department of the school, including the technical portion of it, which is under the charge of a manual instructor. A special regulation creates two kinds of Certificat d'Aptitude, the one for the post of director, the other for that of a teacher at these schools. This provision, it may here be mentioned, has not as yet been carried into practice. Those who are placed in charge of the workshops (préposés à l'apprentissage) are proposed by the council of the school and are appointed by the Prefect or the Mayor. The syllabus of instruction requires the approval of the minister. On leaving the school pupils receive a certificate of their commercial or industrial training. The boys usually wear a special dress for the workshop.

The teaching staff, both for general and for scientific subjects, are paid by the State. This also applies to the foremen and managers (chefs de travaux et chefs d'atelier). The staff is appointed by the Minister on the nomination of the Prefect or the Mayor, according as the school belongs to the Department or the Commune, and with the advice of the school council. The foremen and manual instructors (contre-maîtres et ouvriers instructeurs) are appointed by the Prefect or the Mayor, and are paid by the Department or the Commune. Great care, especially in regard to moral character, is to be exercised in the appointment of the foremen and instructors. The expenses of plant and maintenance are defrayed by the Department or the Commune, who have to enter into an engagement to support the school for a minimum period of five years. A resolution of the Conseil général of the Department, or of

the municipal council, is sufficient for the purpose of converting an École Primaire Supérieure Professionnelle into an École Pratique, thereby withdrawing it from the joint authority of the two Ministries, and placing it under the exclusive jurisdiction of the Ministry of Commerce. Such a resolution is to be transmitted to the latter, and a duplicate of the same to the Minister of Public Instruction. It may be added that the question of deciding as to the exact circumstances under which an École Primaire Professionnelle is to be converted into an École Pratique has naturally proved rather a difficult one. With a view of arriving at a decision in each case, a special Commission was appointed in January 1895, but so far its deliberations have experienced a good deal of delay. There are at the present time (December 1897) 10 Écoles Pratiques d'Industrie or exclusively industrial schools; 11 Écoles Pratiques d'Industrie et de Commerce, industrial and commercial (three of these are for girls), and one École Pratique de Commerce, which is purely commercial. They contain a total of 3,125 pupils.

In aid of the erection and fitting up of such schools the Ministry of Commerce is authorised to grant subventions to departments and communes up to one-fourth of the total outlay. Schools may be founded by several departments or communes in conjunction. This provision, it is pointed out, will prove useful in the case of small towns situated in industrial or commercial districts whose individual resources would be insufficient to provide a technical school.

In the Écoles Pratiques de Commerce ou d'Industrie the French State has for the first time successfully introduced the principle of trade teaching into the general system of primary technical education. The fact that these schools are the outcome of much controversy and many years of effort entitle them to be regarded with some interest.

Primary technical education in France may now be said to have passed through the four stages of subordination, predominance, independence, and annexation. The first stage is represented by the ordinary Municipal École Professionnelle; the second stage by the State schools of Vierzon, Voiron, and Armentières; the third by the Écoles Pratiques, subject to the exclusive control of the Ministry of Commerce; and, finally, the fourth stage by the comparatively recent and not yet fully developed tendency to convert some of the more important Écoles Professionnelles into Écoles Pratiques. It is a fact worthy of note that M. Paul Jacquemart, Inspector-General of Technical Education, in his Report on the occasion of the Paris Exhibition of 1889, expressed the opinion that all the Écoles Primaires Supérieures were likely to assume a technical character, to become Écoles Primaires Professionnelles. At the present day it is predicted that all the Écoles Primaires Professionnelles are destined, sooner or later, to be converted into Écoles Pratiques, whether of commerce or industry. The Ministry of Commerce will, if slowly, yet surely extend its borders. The point which offers least resistance to its advances is the neutral zone of schools which have not been definitely assigned to either Ministry. Of these the important school of Vaucanson, near Grenoble, will, it is said, shortly pass over to the Ministry of Commerce. Even the question of converting the three Écoles Nationales Professionnelles of Vierzon, Voiron, and Armentières, the joint creation of the two Ministries, has been mooted. Such a measure would, however, be one of doubtful expediency, and would run counter to the views of some of the best French authorities who recognise the danger of introducing too great a uniformity into Technical education. It would appear preferable that the two types of school should continue to exist side by side, and that, while both recognise the predominance of trade teaching, the one should be specially adapted to the more liberal and

varied, the other to the more restricted and mechanical requirements of industrial life.

The following account of some of the primary and secondary schools which, with the kind permission of the French Minister of Commerce and Industry, I have personally visited, may serve to illustrate both the course of legislation which has just been sketched, and the progress, in recent years, of French technical education. In the selection of the schools described I have been guided by the desire to supplement the Report of the Royal Commission on Technical Instruction of 1881, and at the same time to describe some new and typical schools which have grown up since that date.

2. VISITS TO SCHOOLS.—PRIMARY AND SECONDARY.

ÉCOLES PRIMAIRES SUPÉRIEURES PROFESSIONNELLES

(UNDER TWO MINISTRIES).

NATIONAL SCHOOLS.

VOIRON, VIERZON, and ARMENTIÈRES.

The general character and status of the Écoles Nationales Professionnelles, Voiron, Vierzon, and Armentières, has already been explained. They owe their initiation to the report of a Government Commission which, after the passing of the law of 1880, was sent to inquire into the condition of German, more especially of Bavarian, apprenticeship schools. Though designed as models for a new order of primary technical schools, they have not met with any direct imitation. Independently of the financial difficulties which, as has already been pointed out, rendered the law of 1880 nugatory, the trend of public opinion in France on the subject of primary technical education has not, on the whole, been favourable to this type of school. The tendency has been rather to accentuate still more the line of demarcation between technical and general instruction, and to render the former, where it exists at all, as predominant as possible. The ground which the three Government schools were to occupy has, in large measure, been encroached upon by the creation in 1893 of the Écoles Pratiques d'Industrie, and by the re-organisation, in the same year, of the Écoles Primaires Supérieures. The Écoles Pratiques d'Industrie are, as has been shown, the outcome of an urgent demand for genuine trade schools, in which theories on the advantages of a judiciously mixed education are subordinated to the imperious need of forming, in view of the complete collapse of the apprenticeship system, a new class of apprentices and workmen. The latitude which enables the Écoles Pratiques to provide a practical industrial and commercial education, either concurrently or separately, adds very much to their usefulness and their adaptability to local needs. The Écoles Primaires Supérieures, on the other hand, have so amplified and varied their programme as also in some measure to meet the special needs of an industrial, commercial, or agricultural population. The three government schools, however, though they have not been generally accepted as a

solution of the practically insoluble problem of an education which shall satisfy at once the requirements of general culture and of modern trade, may claim to possess all the advantages which a policy of compromise is capable of. They may be considered as representing, in the most attractive form, the principles on which their foundation is based. They call attention in their programmes to the advantages of their system, and desire, apparently, to be considered as far removed from the narrow mechanical groove of the *Écoles Pratiques d'Industrie* as from the vague and abstract training of the mere *École Primaire Supérieure*. Some opinion on this question may be formed from the following comparative statement of the time allotted, in the official time-tables of the three types of school, to the principal subjects of instruction. For purposes of comparison, the industrial, as contrasted with the general, section of the *Écoles Primaires Supérieures* has been selected. The industrial, like the two other special sections, the commercial and the agricultural, applies only to the second and third year of the course. The subjects given do not include the preparation of lessons, to which, in the case of the *Écoles Pratiques*, nine hours a week are allotted.

Subjects.	Écoles Primaires Supérieures. (Section Industrielle.)			Écoles Nationales Professionnelles. (Voiron.)			Écoles Pratiques d'Industrie.		
	Years.			Years.			Years.		
	I.	II.	III.	I.	II.	III.	I.	II.	III.
Workshops or manual work -	—	6	6	14	17½	a. 24½ b. 17	30	30	33
Arithmetic, Algebra, Geometry, Mechanics, &c.	—	3	3	5	6	4	10	3	4½
Writing and Drawing of various kinds.	—	5½	5½	6	6	6	10½	6	6
Natural Science and History	—	3	3	4	4	4	—	1½	4½
Literary:—Reading, Grammar, Composition, Geography, History, Languages.	—	5	5	9	8	6½	7	6	6
Other subjects:—Book-keeping, Technology, Singing, Gymnastics.	—	7½	7½	2	2½	2	2½	—	—
Hours per Week -	—	30	30	40	44	47	45	46½	49½

It is apparent from this table that, owing to the much greater length of the hours of work at the *Écoles Nationales Professionnelles*, as well as at the *Écoles Pratiques*, these two types of school provide more instruction than the industrial sections of the *Écoles Primaires Supérieures* or Higher Grade Schools, not only in technical, but in purely literary subjects, such as reading, grammar, composition, geography, history and languages. It is also evident that, except in drawing, which is an essential accompaniment to workshop practice, the *Écoles Nationales Professionnelles* devote considerably more time to theoretical instruction than the *Écoles Pratiques d'Industrie*. It may be added that the regulation number of hours for the general, as well as for the other, sections, in the *Écoles Primaires Supérieures* is 30 a week.

VOIRON.

The establishment at Voiron embraces, as already explained, three schools representing three grades of primary education, and each school is housed in a separate building. Moreover, in the higher Grade School, a distinct wing of the building is allotted, both for teaching and other purposes, to each of the three years of the course. The grounds and buildings cover an area of nearly ten acres. The total number of children is about 450, viz., 100 in the infant school (into which boys only, from two years of age, are admitted), 100 in the primary school and 250 in the higher grade school. Of these 250 about 200

are boarders. The full annual school fee is 20*l.*, which represents the actual expenses of board, as the instruction itself is quite free. There is, however, a charge of 1*l.* a year to defray the cost of books, tools, and materials. Parents are also expected in every case to provide their children on entering the school with a general outfit, of which the value is estimated at 8*l.* The Government awards a certain number of scholarships which cover, wholly, or in part, the amount of the school fees. These scholarships are competitive, and are open to boys of the *Écoles Primaires Supérieures* and the *Cours Complémentaires* and to all who hold the certificate of a primary school, and have attended, in places where it is established, the *Cours Supérieur* (11 to 13 years of age) of an elementary school. Candidates must be at least 12, and not over 15, on the 1st of October of the year in which the examination takes place. The examination comprises (1) composition on a subject relating to history, geography, or moral and civic education. (2.) Treatment of a subject connected with elementary natural and physical science. (3.) A sum in arithmetic. Two hours is allowed for each of these subjects. The candidates who qualify in them have, after an interval, to pass an oral and practical examination which extends over three days. The oral part consists in (1) reading a page of a French author with questions on spelling and grammar. (2.) Elementary questions on history, geography, and the duties of a citizen. (3.) Elementary question on natural and physical science, up to the standard of the higher course of an elementary school. The practical examination consists in geometrical drawing, a test in manual work, and a gymnastic exercise. The examination board, which is appointed by the two Ministries, draws up, in order of merit, a list of candidates who have finally qualified, and makes recommendations as to the scholarships to be awarded. At Voiron, at the present time, about 18 of the boarders, *i.e.*, one in 12, are in receipt of the whole, or part, of a Government scholarship.

About four-fifths of the boys remain at the school for the full three years. The remainder, through the poverty of their parents, or for other reasons, only stay till the end of the first or the second year. The number of boys who annually leave the school is on an average about 100. Last year it was 117. I am indebted to the director of the school for the following comparative table, giving, from the date of the original foundation of the school, the average of the different employments which the total number of these boys have taken up:—

Government or military establishments	-	about	5
Railways	-	below	5
Trade	-	about	10
Agriculture	-	"	10
Secondary instruction (<i>Arts et Métiers</i> , Cluny,			
Marine Engineering)	-	"	20-30
Industrial occupations	-	"	50
Various employments, or unclassified	-	"	10

The various occupations of the parents of the boys show the following percentage:—

Railways	-	5 per cent.
Professional or independent	-	5 "
Small officials	-	10 "
Agriculture	-	below 20 "
Trade	-	20-30 "
Industrial	-	40 "

Each of the three schools is the centre of an industrial region, and is designed to train apprentices for definite trades. Besides metal and wood work, which is common to the three districts, each school has a speciality: Voiron, the weaving of mixed silk and flax; Vierzon, pottery; and Armentières, the weaving of flax and cotton.

In the third year of the course there is a special section which prepares for the *Écoles d'Arts et Métiers*, Cluny, and Schools of Marine Engineering. At

Armentières there is also preparation for the Institut Industriel at Lille. The present organisation of school work at Vierzon is as follows :—

1st year : 3 parallel classes	{	Section A	} General education and commencement of industrial apprenticeship.
		" B	
		" C	
2nd ,, 2 ,,	{	" A	
		" B	
3rd year : 2 distinct classes	{	(1.) Special section, preparatory for Écoles d'Arts et Métiers, &c.	(2.) Normal section, theoretical and practical training for industrial apprenticeship.
		(2.) Normal section, theoretical and practical training for industrial apprenticeship.	

At each of the three Écoles d'Arts et Métiers, Chalons, Aix, and Angers, five scholarships are reserved, by special regulation, for the first five successful candidates sent up by primary technical schools recognised by the Ministry of Commerce.

Voiron also provides teaching in agriculture. About a year ago a special section, with a building and garden of its own, was added to the school for the purpose of training boys for the agricultural industries of the Department of the Isère, which are of considerable importance. By utilising the numerous waterfalls of the surrounding country for electric and water power, a considerable impetus has of late years been given both to chemical industries connected with agriculture and to the manufacture of paper from wood. The new subject of instruction, which was introduced with the desire of avoiding the expense of a separate school of agriculture, such as is really needed, has not met with any success. The section is found to be out of keeping, and difficult to work, in a school which is mainly industrial. It has at present only 15 pupils.

The accommodation of the workshops is very complete. The carpenters' shop measures 24 mètres square, and contains 50 benches. The boys of the third year work at carpentering about 25 hours a week, at the rate of about four hours a day. The forge room is about 12 mètres square and has nine forges. The fitting room is 25 mètres square and contains 104 vices. The greater part of the machines have been constructed by the boys. At the opening of the school there were only two machines and 30 vices in the room. The weaving room measures 24 mètres square and contains five power and 12 hand looms. A small room, hitherto used for drawing, is shortly to be fitted up for electrical apparatus. There is a special course of electricity, and some electrical apparatus are also constructed. Steam power is provided in all the workshops, and the building is lit throughout by electricity.

A court, in which the boys do gymnastics, measures 20 mètres by 11. It is used by sections of 40 boys at a time. During the first year there is walking exercise on two days, and during the second and third year on one day in the week.

The town does not contribute anything to the maintenance of the school itself. At its foundation, however, it made a grant of 15,200*l.* There is no subvention from the Commune as is the case in Communal schools. In these the teachers receive, besides their salary from the State, which is uniform for the whole of France, a small allowance, the so-called *indemnité de résidence*, which is intended to cover the expenses of board, and which varies according to the population and the consequent local cost of living. Thus, at the higher grade school at Grenoble, a master receives 96*l.* from the State and 44*l.* from the Commune as *indemnité de résidence*. In addition to the latter, the Commune provides the building, and the whole cost of heating, lighting, and teaching plant. This arrangement is common to the whole system of primary education throughout France in elementary as well as in higher grade schools, with the important distinction that in the case of elementary schools the expense incurred by the Commune is obligatory, whereas for higher grade schools it is optional.

In 1876 the revenue of the school at Voiron amounted to about 9,960*l.*, and the expenditure to about 7,719*l.*, including about 3,092*l.* for the teaching staff, 2,537*l.* for food, 1,246*l.* for plant, &c.

It may, in conclusion, be said that both as Government schools, with all the attendant prestige which an official stamp always brings with it in France, and as centres of important industrial districts, whose requirements they are specially adapted to meet, Voiron, Vierzon, and Armentières occupy a strong position. From a purely administrative point of view, however, as institutions which, in spite of the predominantly technical character of their instruction, are still under the divided control of two Ministries, their status is somewhat anomalous, and it is doubtful whether it will be long maintained. The probability is that, as already said, they will eventually come under the exclusive jurisdiction of the Ministry of Commerce. This would be a further step in the direction of simplifying a system, of which the complexity has been productive of considerable friction and loss of energy.

COMMUNAL SCHOOLS.

PARIS.

The primary technical schools of Paris fall under the official designation of *Écoles Primaires Supérieures Professionnelles*, and are under the operation of the law of December, 1880. In their case, however, "Professionnel" must be taken to denote a much higher standard of technical instruction than is usually signified, by that term in the provinces. In Paris an *École Professionnelle* means a school "qui enseigne une profession, qui fait de l'apprentissage." In the country the title may be applied to a school where the time devoted to manual work is quite inadequate for the practical purposes of any calling or trade. The *Écoles Diderot, Boulle, and Estienne* are, in all respects, trade schools, differing in name only, not in kind, from the schools which, in the provinces, are classed under the official name of *Écoles Pratiques d'Industrie*.

The Paris schools have the great advantage of being under the active supervision of a rich and powerful municipality, which is very jealous of its independence, and though nominally subject to the authority of the Ministries of Public Instruction and of Commerce, is practically autonomous. In 1897, in addition to special grants, to the value of 6,000*l.*, the sum spent by the town on her primary technical schools for boys and girls, and on the Secondary School of Chemistry and Physics in the rue Lhomond, amounted to about 61,698*l.* It must be borne in mind that the instruction is in all cases gratuitous, and that at the *École de Physique et de Chimie Industrielles* just referred to, the pupils, who belong to Paris, are even paid 2*l.* a month during the term of their studies.

INDUSTRIAL ART.

There are three schools at Paris which teach Decorative Art in its direct application to industry, the *École Nationale des Arts Décoratifs* (Application des Beaux Arts à l'Industrie), the *École Germain-Pilon*, in the rue Sainte Elisabeth, and the *École Bernard-Palissy*, in the rue des Petits-Hôtels. With the first of these, which includes advanced as well as elementary instruction, and which has not undergone any change of importance since the visit of the Royal Commission, this report is not specially concerned. It is a Government institution under the immediate jurisdiction of the Ministry of Public Instruction, with an annual grant of 4,320*l.* The town of Paris no longer contributes anything to its support. There are both day and evening classes. The majority of the pupils, of whom there are now 1,200, as compared with 800 in 1882, are between the ages of 10 and 20. Many of them return to the school after they have completed one year's military service. A law passed in 1889 granted a special dispensation from the usual term of three years with the army to all art students engaged in a regular study of sculpture, painting, and architecture. This exemption was, as may readily be conceived, sufficient to give all Schools of Art an immense increase of popularity, so much so that the new privilege had to be made a matter of competition. At the *École Nationale des Arts Décoratifs* there are seven different kinds of prize to which the exemption is specially attached. Scholarships, amounting to the

annual value of 1287., used formerly to be given to eight students. The same sum is now spent in prizes which are distributed amongst 20 or 30 recipients. It was found that the usual effect of the scholarships was to render the holders of them idle and unproductive. The school premises are in a bad state of repair, and their accommodation is quite inadequate. There is now question of erecting another building on a new site.

The report of the Royal Commission refers to the fact that "in no school in Paris is drawing at present taught solely in its application to special trades." It also calls attention to the new decree of December 20, 1882, by which "the school of the Rue Sainte-Elisabeth and that of the Rue des Petits-Hôtels, are to be reconstituted and created Écoles d'Application des Beaux-Arts à l'Industrie, thus giving a more technical character to some of the art teaching in Paris." A distinction must, however, here be made. It was not the intention of the decree referred to, or of the municipality, to create two schools independent of one another, both teaching, in an equal degree, the application of art to industry. The schools were, on the contrary, to be closely connected, being respectively preparatory and complementary to one another. Whilst the École Germain-Pilon is an "École Municipale Préparatoire de Dessin pratique," the École Bernard-Palissy is an "École Spéciale Municipale d'Application des Beaux-Arts à l'Industrie." The École Germain-Pilon is an École d'Application de Dessin," teaching the principles of drawing in their relation to industrial art as a whole, but without reference to any special branch of it, and without any practical work in workshop or studio. The École Bernard-Palissy, on the other hand, is an école d'application in a more literal sense, intended for the purpose of forming *ouvriers artistes* for four different trades, and having four special *ateliers* for painting in porcelain, sculpture in wood, stone, and marble, theatrical and domestic decoration, and lastly for designing in stuffs. While there still continues to be an essential distinction in the aims and the practical training of the two schools, time has shown the original scheme of their interdependence to be impracticable. It was found, as might have been expected, that the parents of the boys could not afford a course of study extending over six years. In order to counteract the loss of pupils which the new system entailed on the École Bernard-Palissy, leave was granted to the latter to take boys who had not passed through the École Germain-Pilon, and to add a fourth year to its course, the first year now becoming a stage preliminary to admission into the workshops. This new arrangement, which virtually renders the two schools separate and independent, though their connection still nominally exists, has proved beneficial to both of them. Besides saving the École Bernard-Palissy from gradual extinction, it has given a great impulse to the development of the École Germain-Pilon under the experienced management of its present director. Since 1889, the year of his appointment, important alterations have been introduced, tending at once to make the teaching more scientific and to place the school in closer touch with local industries. Special attention is now given to geometrical drawing which, in the second and third year, includes perspective and the projection of shadows. The syllabus also includes decoration as applied to architecture, water-colour, the history of furniture and of the chief objects of art connected with it, the history of art, modelling, analysis of style, decorative composition and anatomy. The ultimate object of each branch is declared to be one and the same: *L'art décoratif est le but vers lequel est dirigé tout l'enseignement de l'école*. Instruction in casting (*moulage*) and in *passementerie* and embroidery are subjects recently introduced. In order to meet the wishes of the master guild of *Brodeurs* and *Passementiers*, which was on the point of forming a special school of its own, it was arranged that 12 lessons on these subjects should be given at the school during the last three months of the year by special instructors, who are paid by the guild. The pupils who have attended these lessons, and subsequently enter the trade, receive wages at once. Special prizes are awarded, and the guild moreover engages to find places for five apprentices annually. Similar arrangements with other guilds will probably be made in the future. A case was mentioned to me in which a master-locksmith applied to the school for an apprentice, who learnt his business in six months, and is now after three years' experience in charge of the establishment and earning 16*l.* a month. The Municipal Council appears

to be satisfied with the general support given to the school by trade employers.

The instruction is still limited to theory; thus the theory of artistic style, as applied to furniture, is taught by the same teacher who, at the École Boulle, the special school of furniture at Paris, teaches the actual construction of the articles themselves.

The École Germain-Pilon is conducted on the strict lines of an ordinary school. The absence of a pupil is at once reported to the parents; whereas at the École des Arts Décoratifs above mentioned, much greater liberty is allowed. The director is immediately responsible only for the day boys. Evening pupils come, or stay away, more or less as they please. They must, however, attend at least 60 times a year in order to be allowed to compete for prizes. Boys who have the Certificat d'études primaires are admitted at the age of 13, those without it at 14 years of age. In the latter case parents must engage to leave their children at the school for three years. At the end of each year there is a remove examination (*concours de passage*). The present number of day boys is 40 in the first year, 36 in the second, and 16 in the third. There are, besides, about 180 evening pupils, making 272 in all. There is no accommodation for more than these. The maximum number taken by one teacher is 40. Work begins at 8. The morning is spent in desk work. At 11 there is an interval of two hours. The afternoon, from 1 to 4, is occupied with class teaching, except on Saturdays, when there is painting in water-colours. At 8 o'clock the Evening Classes commence. The school is entirely under the control of the Paris Municipality, which makes an annual grant of from 2,200*l.* to 2,400*l.* This amount, 1,640*l.* of which is accounted for by the salaries of the director, teachers and superintendents, shows only a slight increase since 1883.

Owing to the unique position which the École Germain-Pilon occupies in Paris and in France generally, the school is not unfrequently visited by strangers who are experts in the artistic training of children. The impression usually produced on his German visitors, whose opinion he evidently values, was referred to by the director, and may be cited as characteristic. Their general remark with regard to the prize exhibits of the first and second year boys is merely "The standard is much the same as that of our own schools"; but, on seeing the work of the third year, they freely admit "We can do nothing as good as this." This verdict, so often due to the delicacy of French touch, is, no doubt, specially applicable to those simpler and purer realms of decorative design which are specially suitable to the young, and in which natural artistic instinct is unaffected by the wilful eccentricities of modern fashion.

A few more details may now be given with regard to the École Bernard-Palissy. There are at present 112 day and 122 evening pupils. The former, who are not admitted till the age of 13, enter the workshops at the end of the first—preparatory—year, and, having spent about a fortnight in each of them, are definitely attached to the one for which they have shown most aptitude. Most of the boys remain for the whole course of four years. The evening pupils, who must be at least 14 years old on entry, have complete liberty of choice as to the subjects which they take up, and are not bound to the same regular attendance as the day boys. The workshop apprentices are distinguished as *peintres, décorateurs, dessinateurs pour les étoffes, sculpteurs, et céramistes*. The evening classes are also attended by a certain number of adult workmen. The hours in the morning are from eight to eleven o'clock, in the afternoon from one till four in the winter, and from one till five in the summer; and, lastly, in the evening from eight to ten.

The town makes an annual grant to the school of 2,920*l.*, of which 2,240*l.* goes to the teaching staff. Six bursaries, of 8*l.* to 24*l.*, are also annually awarded. 160*l.* in prizes is divided every three months amongst about 20 pupils. The Department makes a breakfast allowance of 50 centimes to a certain number of children who come from the suburbs of Paris. All the chief materials used in the studio, such as wood, stone, and paints, are supplied gratuitously, but copy-books, pencils, &c., are not furnished. Some of the models in use are borrowed from the Trocadero Museum, but most of them are purchased, the outlay being very considerable. Amongst other objects serving as patterns of taste, a beautiful panel from an old chateau at Bercy called to mind the advantages which France derives from the memorials of her

artistic past. I am informed that the practical utility of the school, of which, it may be mentioned, the accommodation is very poor, is still a matter of doubt. Considerable difficulty is experienced in finding suitable trade employment for boys at the end of their course. Fear of competition renders the actual workers in the trade unfavourably disposed. The employers, who are usually designers in fabrics and furniture, on the other hand complain that the work of boys fresh from the school is not sufficiently profitable. They do not get through their work fast enough, and have not acquired the requisite "tour de main." The three hours a day spent in learning their business at school are not sufficient to place them on an equality with trade apprentices, who are daily engaged for ten hours.

Things are, however, improving somewhat. There were applications for three apprentices in March of this year and one in the first week in April. A few employers, one of whom lives in the rue Paradis, even insist on having apprentices who have passed through the school. From another employer, who deals in painted glass, a former pupil receives nine francs a day, but this is exceptional. A certain number of pupils pass on to the Académie des Beaux-Arts. Such a course is, however, considered abnormal and undesirable, for it is not the purpose of the school to form painters or sculptors in the ordinary sense of the term.

FURNITURE.

ÉCOLE BOULLE.—The École Boulle was founded in 1886 by the Municipality for the purpose of training workmen capable of "maintaining, in the manufacture of artistic furniture, the traditions of taste and general superiority by which the industries of Paris are distinguished."

The name of the school is derived from the celebrated French cabinet maker, Boulle, who was born in 1642, and was the inventor of a style of furniture of which rich ornamentation in tortoiseshell, copper gilt, and white metal is the characteristic feature.

Work is carried on in two separate departments, one for furniture, the other for metal work. The first, which was founded in 1886, includes cabinet making, upholstery, wood-carving, and the construction of sofas and chairs. The second department, opened in November 1895, includes chasing, as applied to furniture, art bronzes, and gold and silver work, mounting as applied to the same objects; and thirdly, engraving, except so far as this is employed in connection with the manufacture of books.

The apprentices, of whom the number has increased from 60 to 240, are drawn from the Elementary Schools of Paris.

Ninety-six boys are annually admitted by competitive examination. Of these 60 pass into the Furniture and 36 into the Metal Department. The examination includes the usual subjects required for the primary leaving certificate, drawing from the round from a plaster model, and a test in manual work. The latter is, however, not obligatory. The school is open only to boys whose parents live in the department of the Seine, and who are at least 12, but not over 16 years of age. For those who live in Paris the instruction is quite gratuitous; those living in the suburbs are admitted on payment by the municipality concerned, of 8*l.* a year.

The course of instruction extends over four years, a period which is found to be hardly sufficient for the thorough training of an apprentice. During the first six months boys pass through the various workshops, for the remainder of their time they are restricted to the special branch of trade, for which, in an examination held for the purpose, they have shown special aptitude. The general instruction includes French, arithmetic, history and geography, and industrial economy. About two hours a week (together) are given to chemistry, physics, and botany, and two hours to the history of art. The boys are, it is said, quite familiar with the chief characteristic features of various artistic periods. During the first and second years about 19 hours a week are spent in theoretical and 32 in practical instruction; in the third and fourth year, 24 hours are given to the first and 32 to the second.

There is a special room for marqueterie, for the apprentices in cabinet-making, and a water-colour studio for those who learn upholstery. One room is devoted to mounting and chasing, another to artistic drawing and plaster

work, and a third to geometrical and industrial drawing. A room for engraving is used in common by the different sections.

There are eight foremen: two for cabinet-making, two for upholstery, two for wood-carving, one for turnings, and one for the manufacture of sofas and chairs. They are specially selected by means of an examination, held by a joint examining board of employers and working men, which includes drawing and modelling, as well as practical work. They commence at a salary of 140*l.* per annum, and their time is wholly given up to the school. Over them are placed two chief foremen, one for furniture and one for metal work. All appointments on the teaching staff are subject to examination.

The furniture constructed is sometimes given away for charitable purposes, but, as a rule, it is taken to pieces again when completed; the same materials being used over and over again. The instruction is all strictly practical, in accordance with the best methods used in the furniture trade. The present school which is, like the original building in the Rue de Reuilly, was completed in 1895. It is a lofty, handsome, three-storied structure, forming three sides of a square, with large, well-aired and well-lighted rooms. The accommodation of the workshops is excellent. The approximate dimensions of the cabinet-making, wood carving, and chair-making rooms are respectively 40 × 8, 30 × 8, and 25 × 8 metres. The special advantages offered by this school are considerable. The boys are encouraged to work by small prizes in money, clothes, and books. They are provided with a substantial lunch at 12 o'clock, besides a piece of bread at 10 and three. In the case of Paris children the meals are free; to boys from the suburbs they are given at a fixed charge. Periodical visits are paid to the chief monuments and manufactories of Paris and the neighbourhood. A diploma is awarded to the apprentices—and to these only—who, on conclusion of the complete course of four years, pass the final examination. Sums varying from 2*l.* 10*s.* to 12*l.* may also be given to those who pass with distinction.

The school enjoys the privileges of the French military law of 1889, which grants a remission of two years' military service to a certain proportion of those who are engaged in artistic studies, and who succeed in passing a special Government examination.

Too short a time has elapsed since the foundation of the school to admit of any real estimate as to its practical results. A few of the old apprentices have found places as foremen in the furniture trade. I understand that up to the present, though efforts have been made to enter into relations with some of the furniture guilds in Paris, the latter have not extended any encouragement or support to the school. This fact is attributed to trade jealousy and fear of competition. Judging from other instances, however, it is very possible that this feeling may soon subside.

The entire cost of the school for the present year, 1897, is about 11,131*l.*, viz., 6,731*l.* for the teaching staff, and 4,400*l.* for maintenance.

It may be added that, in connexion with the school, free evening classes are held in artistic style, decoration, modelling, water-colour, chiselling, &c., from the 15th October to the 31st of May, on five days in the week, from 8.15 to 10 p.m.

PRINTING AND BOOKBINDING.

ÉCOLE ESTIENNE.—The École Estienne, the compeer of the École Boulle in its generous conception and its high standard of efficiency, was founded in 1887. It has occupied its present handsome premises in the Avenue d'Italie which, with the grounds attached to them, cover an area of 5,000 metres, since November 1895. The number of apprentices, originally 140, is now about 240. As at the École Boulle, candidates, who must be at least 12 years of age (or 13, if without a primary leaving certificate), are admitted by competition, and special privileges are granted to those who reside in Paris.

The purpose of the school is to form workmen for the various arts and trade processes connected with the manufacture and printing of books. The number of boys annually admitted varies from 75–90. The course of training lasts four years. For the first five months, from October to Easter, the apprentices are divided into separate groups, who spend a week successively in each workshop. The future destination of each apprentice is decided by a competitive examination, and to some extent by his own preferences.

The theoretical instruction, of which the principal subjects are drawing and modelling (two hours a week), arithmetic in the first, and geometry in the second year, (two hours), chemistry and physics (two hours), facts of natural and physical science (one hour), French (two hours), and history and geography (one hour), is in the hands of nine masters, and takes place from 8.30 to noon. During the first and second year these subjects are common to all the apprentices. For the third and fourth year, the teaching is divided into three separate courses, special provision being, to some extent, made for the requirements of particular trades. The first course is for engineers, lithographers, and bronzers; special attention is given to drawing, and there are lessons in water-colours, the history of art, and anatomy. The second course is for compositors, stereotypers, photo-engravers, and binders, and includes French history, reading of Greek, and elementary science. The third course is for type-founders, and printers in typography, lithography, and etching. They learn French, history and geography, and mechanics. Drawing and modelling, and artistic composition are taught in all three courses. The general standard of the instruction is that of the higher grade classes attached to a primary school, except in drawing, in which the requirements for engravers and art lithographers and bronzers are considerably higher. Apprentices of the third and fourth year have theoretical instruction only on four mornings a week; the whole of Friday and Saturday they spend in the workshop.

The technical instruction is given throughout the school from 1 p.m. to 6 p.m. every day in the week, including Thursday, the usual half-holiday in France.

The subjects taught are as follows:—

- I. Typography.—Casting of type. Composition. Impression (hand-presses and machines). Stereotyping and electrotyping. Four rooms in all.
- II. Bookbinding.—Binding, gold blocking. Two rooms. Apprentices in bookbinding are also taught gilt-edging and marbling by specially engaged experts.
- III. Engraving.—Engraving on wood. Engraving on brass, sunk and in relief. Engraving on steel. Etching. Four rooms.
- IV. Lithography.—Engraving on stone. Chromolithography. Lithographic drawing and writing. Impression (hand-presses and machines). Apprentices in lithography are in addition taught facsimile writing (autographie) for two hours a week. Four rooms.
- V. Photography and photographic reproduction processes (photo-engraving and half-tone). One room.

Each of these 15 rooms has its own technical instructor, an expert in the subject and selected by competition. There are, besides, four auxiliary teachers.

It is claimed for this system of instruction that it offers peculiar advantages to the children of the working classes. It enables them, whilst continuing their primary education up to the age of 17 or 18, to learn in its entirety, one of the definite branches of printing and bookbinding. Within the compass of each of these branches there is no narrow specialism which restricts a boy closely to a single trade process, and leaves him totally informed as to all preceding or subsequent processes. The instruction, instruments and materials requisite for a thorough knowledge of the whole subject are freely offered to every apprentice. The school does not require its pupils to produce for the trade, but aims exclusively at their individual development, which is fostered by a careful study of the best examples and models. Thus compositors in typography, starting from quite rudimentary exercises, are ultimately capable of executing the most intricate compositions in several colours. On the other hand the school does not profess to teach every department of the trade, which would be equivalent to teaching none at all. During the first five months of the course apprentices make a passing acquaintance with all the workshops, but at the end of this probationary period, they are definitely assigned to one in particular, and become, for the remaining 3½ years of their training, compositors, printers, engravers, lithographers, &c.

As an instance of the comprehensiveness and variety of the instruction afforded, we may take the room for lithographic drawing, ably presided over

by M. Mauler, a former pupil, at the Académie des Beaux-Arts, of a distinguished German artist who left France at the outbreak of the war in 1870. With a view of giving them every possible chance of finding subsequent employment in one or other direction, apprentices in this department are taught four distinct branches of the subject, viz., drawing in ink, drawing in crayon, chromolithography, and facsimile-writing. The conditions under which the work is carried out would, I think, be difficult to excel, or to equal, for method, thoroughness and refinement. Amidst the artistic surroundings of what is more a studio than a workshop, it is nevertheless evident that the instruction is strictly practical. Many of the coloured lithographs which the boys are studiously engaged in reproducing belong to the modern school of artistic advertisement, a school which, though often decadent in its tendencies, is, as M. Mauler observed, not without decided originality and interest of its own. These copies include well-known figures which English, French, and American magazines and theatrical posters have rendered familiar to the public. I ventured to suggest that some of the more startling ones might be "peu édifiantes" to young apprentices, but was given to understand that considerations of this kind must yield to the objective exigencies of trade.

The work of the school in its various branches is utilised by the town to some slight extent, to the value of about 240*l.* per annum. It is occasionally presented to other schools or to charitable objects. There is very little difficulty in finding situations for apprentices at the end of their course. The jealousy, which existed to some extent at the outset, has almost disappeared. The school is in friendly relations with some of the principal employers and guilds of the trade. Two of these guilds organise public competitions, which are open to trade apprentices as well as to pupils of the school. The latter have obtained 30 prizes during 1893-96. In the same period the work of 12 apprentices has been accepted at the Salon des Champs Élysées, and last year two more were honourably mentioned in one of the public competitions of the same Academy. It may be added that two of the teachers of the school have won the Prix de Rome, the well-known prize of the École des Beaux-Arts.

On entering the trade, gold-blockers earn from 3 to 3½ francs a day; lithographers about 4 to 4½ francs; typographic compositors about 6 francs to 6½ francs; engravers in stone, 6, 7, or 8 francs; artistic lithographers of experience about 12 francs a day.

The estimated cost of the École Estienne for the present year (1897) is about 8,928*l.*, viz., 5,759*l.* for the teaching staff, and 3,169*l.* for maintenance. The original cost of the buildings and equipment may be reckoned at 64,000*l.*

Free evening courses in connexion with the school are held for adult workmen who desire to perfect themselves in their trade. The number of those who attended in the year 1895-96 was 205.

The general characteristics of the École Boule and the École Estienne, their handsome exterior, the professional standing of their masters, the excellent bearing and studious air of the boys, their complete and minute organisation, comparable with that of the best German schools, produce a very favourable impression. They are in a real sense Schools of Art, for they cultivate artistic sense on the basis of theoretical and practical knowledge. They may be regarded as embodying the highest and most modern conception of the primary trade school.

MECHANICAL TRADES.

ÉCOLE DIDEROT.—Of the trade schools in Paris the École Diderot, founded in 1873, is much the oldest. Its object is to form artisans and mechanics for nine different branches of trade, viz., forging, turning in metals, fitting, instrument making, electricity, and model making, boiler making, carpentry, locksmith work, and plumbing. For each of these the school has a special section, except in the case of electricity, a subject common to all third year apprentices of the mechanical trades. The apprenticeship lasts three years, at the end of which an examination is held and a certificate awarded.

Seven hours a day are spent in practical trade work, which is regarded as the chief consideration. Theoretical instruction, which occupies two hours a

day, holds a secondary place. The section in which an apprentice is placed is partly decided by the entrance examination, and partly by the special aptitudes which he may display for any of the various workshops through which he passes during the first four months of his training. The theoretical subjects include French, history, geography, arithmetic, algebra, geometry, technology, mechanics, physics, chemistry, drawing, book-keeping, and domestic economy, a large programme considering the time allotted to it.

The school has not increased its numbers (about 300) since the visit of the Royal Commission in 1883; it has, however, undergone important developments, which are chiefly due to the efforts of the present engineer, M. Kern, who, it may be mentioned, has worked for English firms in Brazil and Russia. In his opinion the former system of the school, as compared with its present policy, was "*plaisanterie et tâtonnement*." No work is now executed at the school but such as is directly practical and useful. The machinery, which in 1883 was in most cases worked by hand power, has been greatly improved and is driven by steam throughout. The walls which used to separate the different sections have been removed so as to produce the appearance of a very extensive workshop; glass partitions have, however, been placed where required against dust and smoke. The electric department is new, and two new sections, one for boiler-making and one for sanitary plumbing, have been added. The latter, erected in view of the increasing importance of the subject, has been arranged on English models. The forge-room has been lengthened, and four new double furnaces have been added.

The school executes a certain amount of work for the town of Paris, chiefly in carpentry and sanitary plumbing. But for the reconstructions which have in late years been carried out at the school, such work would probably have been more considerable in quantity.

The section for sanitary plumbing has now been at work for about 15 months, and has on hand more than a year's work, in gas and water mains, for the town, to the value of about 165*l*.

The boiler-making section began about three years ago to turn out work both for the town and the requirements of the school. Under these two heads it produces to the value of about 1,000*l*. a year.

It is, of course, to the interest of the town to have orders carried out at the school workshops. Thus I was assured that a piece of work, the execution of which, in the school cost the town 36*l*., would in the trade have been valued at 100*l*.

The cost to the town of maintaining the school amounts, without deducting the saving effected by the work gratuitously executed, to about 6,400*l*. In reply to the question "what incentives have the apprentices to exertion in executing unpaid work?" I was informed that for work well carried out they received small rewards at the rate of 75 cents to 3 francs a month.

Mr. Kern assured me that a great improvement has taken place in the attitude both of artisans and of employers towards the school. The former used to be hostile, the latter indifferent. Employers have begun to see that the apprentices on leaving the school, though not finished workmen, yet possess an amount of theoretical knowledge which, in the end, makes them much more efficient than workshop apprentices, who have not the advantage of the same training. There is now no difficulty, as formerly, in finding places for boys on their quitting the school. Though the *École Diderot* has been established for many years, views as to its merits are by no means unanimous. The differences of opinion regarding the school are, however, concerned, not with details of organisation or management, but with the fundamental question of the advisability of trade schools in general. Mr. Lang, Director of the *École Martinière* at Lyons, whose views on primary technical education will be referred to again later, paid a visit to the *École Diderot* not long ago. His inspection convinced him that the practical training which it provides is good and thorough, though not so thorough as that of a trade workshop. The theoretical instruction, on the other hand, he considered "*fonctionnait mal*." In his opinion, it is impossible in an institution of this kind not to neglect one or other of the two divergent interests involved. This view is no doubt perfectly correct. It does not, however, meet the further questions whether the training of a working lad, after he has left a primary school, must, if it is

to be of any practical use to him, not inevitably be one-sided, and whether the alternative to a trade school, with a little general instruction, is not, in the great majority of cases, a trade shop, or a home, without any at all.

Meanwhile the popularity of the École Diderot has not diminished, and its practical efficiency has, been considerably increased. Its continued vitality is the best proof that the school meets a want. The principle which it introduced in 1872 has after more than 20 years of discussion and doubt, received official sanction by the institution of the Écoles Pratiques d'Industrie as a new category of State schools.

MANUAL WORK.

ÉCOLE SALICIS.—In contrast with the Paris schools already mentioned, of which all have the interests of trade as their immediate object, it may be of advantage to give some information with regard to one, which represents the cause of manual, as distinguished from trade, instruction. The elementary school in the rue Tournefort is remarkable as having a more complete organisation of manual work than any other school of the same kind at Paris. The town has at present about 185 elementary schools, of these 88 have wood work, 32 both wood and iron work, while 65 have neither one nor the other. The time usually spent on manual work in an elementary school is three hours a week. The original foundation of the École Salicis is curiously associated with the Franco-German war of 1870, and was largely due to the initiation of the present Director of the École Germain-Pilon, to whom I am indebted for information on the subject. It was, as he humorously expressed it, as an "École Obsidionale" that the school first came into existence, being formed during the siege of Paris, when he was mayor of the fifth Arrondissement, for the purpose of providing employment for the numerous children who were left without occupation, as well as for the teachers who had been compelled to withdraw from the suburbs of the city. The school survived the state of siege from which it had taken birth, and M. Salicis, the well-known late Inspector of Public Instruction, whose name it bears, found in it a suitable field for carrying out his enthusiastic views on the subject of manual instruction. The general aim underlying these views was, to utilise primary schools throughout the country as nurseries of future industrial skill, by introducing a carefully graduated course of manual work, ranging from the simplest exercises in cutting out paper to workshop practice in wood and iron work. It is now generally recognised in France that this idea, though it contains much that is valuable, is subject to strict limitations. The exaggerations to which it has given rise have deprived it of much of its former popularity. So far as organisation, and the provision of general instruction is concerned, there is no difference between the École Salicis and other primary schools at Paris. The three divisions of the school contain 250 children in the following proportion:—

Cours Supérieur, one class	45
Cours Moyen, two classes, of 50 each	100
Cours Élémentaire, two classes, of 50 and 55	105

The manual work is supplementary to the general instruction, and occupies daily $2\frac{1}{2}$ hours for the cours supérieur, and $1\frac{1}{2}$ hours for the cours moyen and the cours élémentaire, i.e. $12\frac{1}{2}$ hours a week for the first, six hours for the second, and five hours for the third. The children of the elementary course do not enter the workshop, but are occupied in the ordinary cutting out and weaving of paper (*pliage et découpage*), common to primary schools. Workshop practice begins in the middle division, which spends three hours a week on manual work (wood and iron), two hours on modelling, and one on technology and making sketches. The higher division spends $7\frac{1}{2}$ hours a week on manual work, wood, iron, and modelling, and five hours on technology and sketching. The whole body of boys who do manual work are formed into three separate sections, which are alternately occupied in iron work, wood work, and modelling. The wood work is taught by a carpenter, the iron work by a mechanic, the theory of the subject having been previously explained in class by the teachers of the school. The workmen come every day for four hours in the evening, three of which are spent in instruction, and one in pre-

paring materials, and in setting and repairing tools. In the morning they spend four hours at another primary school. Their salary for attending to these two schools is 96*l.* per annum. The annual expenditure for the materials used in connection with the manual work amounts to 28*l.* per annum. The modelling and also some casting, is taught by the teachers themselves, who all hold the Government certificate for manual work. The teaching staff consists of five masters and the director. In addition to their State salary, they receive the usual indemnité de résidence, of which the aggregate amount is 204*l.* The school used to have the independent management of its manual instruction until about three years ago, when the subject was officially organised, and placed under the supervision of a special committee of the town council. The manual instruction which the school affords has avowedly an educative, not an industrial, aim in view. Its object is not to form trade apprentices, but merely to train hand and eye in preparation for future apprenticeship. Amongst employers, however, as the director informed me, the purpose of the school is still largely misconceived. They commonly regard it as an apprenticeship school, though, at the same time, there is little demand for the services of the boys. In the opinion of the Director of the École Germain-Pilon the practical utility of the school is much open to question. Its system, though excellent in theory, has so far produced no very definite results, and there has even been question in the town council of suppressing the school together. The fact is, no doubt, that a school which gives so important a place in its curriculum to manual training is exposed to twofold criticism. While inadequate for trade purposes, such instruction may, from a purely educative point of view, be regarded as excessive in amount. It is a case of too little or too much. The latest tendency of French opinion is to look with disfavour on all vagueness of purpose in matters of technical instruction, and to condemn, as an unwarrantable luxury, any system of which the educational advantages are dubious, while the public expenditure is certain. It may be mentioned, in conclusion, that the accommodation of the school is very defective. It is probable that on the expiration of the present lease in three years' time, other premises will be taken.

In connection with the École Salicis, it may be of interest to examine in brief outline the position which manual, as opposed to trade, instruction occupies at the present moment in France. Some interesting facts on the subject are given by M. René Leblanc, Inspector-General of Manual Instruction in the Department of Public Instruction, in his recent publication, "*Enseignement Agricole et Enseignement Manuel*" (Librairie Larousse). The advantages of manual teaching have long been recognised in France. In the days of the Revolution a decree of the Convention made the enjoyment of civil rights conditional on the exercise of some handicraft. As early as 1845 manual instruction was given in many primary schools. In the form of trade teaching, it was successfully introduced at Havre in 1867, and at Paris (École Diderot) in 1872. The principle of manual instruction in its special sense, was, as has been said, for the first time realised on a larger scale in the École Salicis.

Manual work was rendered obligatory in all primary schools in 1882, when the Compulsory Education Bill was passed, the new subject being officially termed "*Travaux manuels et usage des outils des principaux métiers.*" The well-known minister Paul Bert defined the purpose of this innovation as follows: "We do not desire to give a professional character to the primary school, which is not intended to produce either locksmiths or vintners. On the other hand we do consider that scientific instruction should not be confined to mere theory, but that a practical application to various existing industries should be kept steadily in view." He insisted further on the distinction between manual instruction, as furnished by the primary school, and the technical (professional) training "which is the special province of higher grade schools, to whose prosperity it appears to be indispensable." The official directions on the subject called the attention of teachers to the value of manual instruction as a powerful aid to the teaching of drawing.

Towards the end of 1882, at the instigation of M. Salicis, who had been commissioned by the Government to study the conditions existing in foreign countries, a course of lectures, intended to provide training colleges and higher grade schools with teachers in manual instruction, was opened in

December 1882 in the rue Louis-Thuillier. A special Government certificate in the subject was created in 1883. In January 1884, in which the English Royal Commission visited France, a special school of manual instruction was established in the rue des Ursulines, but in the following September this School was incorporated with the higher training college at St. Cloud. This step was officially ascribed to motives of economy and a desire to improve the status of the new subject by associating it closely with an old-established institution. It may be mentioned that the object of the higher training college at St. Cloud is to form teachers for primary training colleges and higher grade schools. The course of study extends nominally over three years, but is practically limited to two. It comprises two sections, the literary and the scientific. There is a competitive entrance examination, including a practical test either in modelling, or in iron or wood work. This test is confined to candidates for the scientific section, for whom alone the subsequent course in manual instruction, which comprises carpentry, fitting, turning, and modelling, is obligatory. The number of students who are annually admitted into, and pass out of, the colleges varies between 15 to 20. The new subject was at first coldly received at St. Cloud, but M. Salicis continued his efforts, and in less than three years succeeded in establishing in most of the training colleges, workshops for wood and iron, a room for modelling, and a chemical laboratory.

In 1886 official directions of a provisional nature, as to manual instruction at training colleges were issued. They were followed in January 1891 by a scheme with a detailed syllabus of manual instruction for a three years' course. Three hours a week in each year are assigned to the subject, and it is further directed that students of the second and third year shall teach the first year's syllabus in the elementary school annexed to the college. This injunction has, M. Leblanc says, been largely neglected hitherto from a mistaken notion that a student's time would be wasted in teaching the very rudimentary exercises specified in the syllabus. At the training college itself the lecturer is to be assisted by a workman (*aide-ouvrier*), whose duty it is to keep the tools in a proper state of repair, and to prepare and distribute the materials required by each student. He may on occasion even take part in the teaching, but, in this case, he is to limit himself strictly to giving such practical hints as may help students to carry out the directions of the lecturer himself. In colleges of more than 80 students two master-workmen may be engaged.

Concurrently with the above regulations the conditions of the Government certificate for manual instruction in training colleges and higher grade schools were modified so as to allow the examination board to judge candidates, not only according to manual skill, but to their ability in teaching. This ability is tested in the examination by requiring candidates to treat some detail of this subject in the form of a short model lesson.

The above measures were brought to completion in January 1893 when official directions were issued as to the manual and agricultural instruction to be given under the new organisation of higher grade schools. The instruction at these schools is distinguished as general, industrial, commercial, and agricultural. In the general section 4 hours, in the industrial and agricultural 6 hours, and in the commercial 2 hours, a week are assigned to manual and agricultural work. The time given to drawing and modelling in the same sections is respectively 3, 4½, and 1½ hours.

The special Government certificate of manual instruction, which is not limited to students at St. Cloud, but is open to all who can qualify for it, has attracted an increasing number of candidates. The examination is held at the Sorbonne in Paris. The requisite standard of efficiency is maintained, not only by the school at St. Cloud, but notably by special courses organised by the City of Paris, with regard to which I am indebted to the Director of the École Salicis for the following details.

A higher course of manual instruction preparatory for the Government certificate is given during six months in the year, from October to Easter, in a municipal school in the Rue de la Jussienne. It is given by one of the municipal inspectors of manual instruction, assisted by two sub-inspectors, and occupies about 10 hours a week, viz.:—6 to 7 hours on Thursday, the usual school half-holiday, and 4 hours on Sunday morning, from 8 to 12. To teachers who hold the Government certificate the town makes an annual

allowance of 150 francs. In addition to this course there are three elementary courses of instruction in manual work, or specially in pliage and découpage, which are intended for the requirements of elementary school teachers in Paris. They are held on Sundays 8 to 12. To teachers who pass the examination held in connection with these courses, the town grants a certificate, which carries with it an annual allowance of 50 francs. In both primary and higher grade schools, the teachers of manual work are assisted by master-workmen, whose duty it is to attend to the practice, as opposed to the theory, of the subject; to prepare the necessary materials, and to keep the tools in good repair. In Paris a special body of such workmen has been formed. Their present number is 95, i.e., 80 carpenters and 15 mechanics. They are in all cases subjected to an examination which, in addition to practical work, includes some geometry and drawing.

In recent times manual instruction has made little progress in primary schools in spite of the fact that it has been an obligatory subject since 1882. This is chiefly due to the law itself which, through the extravagance of its wording, has remained inoperative. Its provision regarding "Usage des outils des principaux métiers," would, if strictly interpreted, have entailed the establishment of workshops in 30,000 communes. The practical impossibility of satisfying the greater demand has led to the neglect of the lesser, the Travaux Manuels. It is this state of things which M. Leblanc would wish to see remedied.

He points out that manual instruction, rightly understood, offers the best possible concrete illustration of the abstract ideas conveyed to a child in arithmetic or geometry. The properties of a square or an oblong may find their most palpable expression in paper or cardboard. If manual instruction is to be fruitful, and not to be felt as an additional burden on an already overloaded time-table, it must not hold a distinct and isolated position in the school curriculum. It must justify its existence by the services which, as a living exponent of abstract principles, it renders to the cause of general education. The aim of manual instruction is purely educative. It is not intended to prepare boys, even distantly, to become professional craftsmen in wood and iron, though it may be most valuable in giving them the taste and aptitude for an industrial career. This truth, M. Leblanc acknowledges, is not admitted by all. There are some, and their opinion is entitled to respect, who hold that manual instruction should begin in the workshop, that boys even under ten years of age should be taught to use the tools of their future trade. There is, on the other hand, evidence to prove that boys of so immature an age are incapable either of using tools at all or of using them in such a way as to avoid physical injury or the contraction of bad habits. The law of 1882 was followed by the establishment, in several large towns, of school workshops for carpentry, turning, and iron work. The experiment proved a failure. It was discovered that boys were, as a rule, incapable of handling a file or a chisel before the age of 12 or 13. To organise such work for the last year of school life would therefore be useless except in cases where (as in the Cours Complémentaire), higher grade classes form part of the primary school. The earliest stage at which, in urban schools, provided with workshops, the simplest kinds of wood and iron work should commence, is the second year of the cours moyen (10 to 11 years of age). The official regulations of 1887 contemplate workshop instruction only for the higher course (cours supérieur, 11 to 13 years) in primary schools, but this course is only organised in a few town schools.

In Paris elementary schools, boys of 10 to 12 are taught wire and repoussé work instead of fitting, as was formerly the case. The turning-lathes have, in spite of their popularity, been given up both on grounds of economy and of the inadequate manual training which they afforded. The workshop instruction also includes, besides modelling, woodwork in which only the simplest tools, such as the rasp and plane, are used. This is continued in the higher course by less elementary exercises.

The employment of master-workmen is in all cases considered essential. As workshops can only be maintained in large urban schools, the tools used necessarily pass through many hands and require constant attention. The wood, too, needs special preparation. Only a professional workman can adequately attend to such matters. Though there is no intention of forming apprentices, it is essential that in the handling of the tools, in the positions taken up during

their use, the most approved methods should be followed. The choice of exercises too, and the processes to be employed, must conform to the best workshop practice, and in all such matters numberless pitfalls present themselves to the amateur instructor. On the other hand the drawing and tracing, the requisite technical calculations and explanations, and finally, the adaptation of the whole to the mental level of the class and to their progress in other subjects, is the special province of the teacher.

Manual instruction in elementary schools is, in M. Leblanc's opinion, considerably prejudiced by the fact that it does not, like sewing in the case of girls, form a subject of examination or the primary leaving certificate. Some test which need, not necessarily be one of manual skill, but might be confined to a drawing, is, he thinks, certainly required.

LYONS.

ÉCOLE DE LA MARTINIÈRE.—The École Martinière was visited by the Royal Commission in 1881. Up to 1895 the organisation of the school remained practically unaltered. In that year, however, the Administrative Council decided to enter upon a radical change of policy which will very shortly come into practical effect. In 1893 a committee was appointed to examine the question of introducing reforms into the existing system of instruction. Their report was issued in 1895, and contained a unanimous opinion in favour of giving a more strictly technical character to the teaching of the school. It was proposed that this should be done by dividing the third year of the course into three distinct technical sections, specially adapted to meet the wants of the principal trades and industries of Lyons and the surrounding region, viz., sections for (1) commerce and weaving; (2) industrial chemistry; (3) civil engineering. The committee enter fully into the considerations which have led them to these proposals, considerations which, as they are based on a general survey of primary technical education in France, and appear to have a direct bearing on the position of many English technical institutions at the present day, may be regarded as of general interest. Whatever their intrinsic merit, they claim attention from the fact that they represent the opinion of experts as to the type of primary technical school which is best adapted to the present requirements of the most important industrial town in France. They may also serve to illustrate, in the case of a single school, a process of evolution through which, though in a more moderate degree, many French schools are probably destined to pass. The report commences by giving a definition of the present character and purpose of the school, as expressed in the words of a pamphlet published by Mr. Lang in 1883. "In view of the special character of the instruction, the Martinière " may be said to occupy a position intermediate between that of a higher " grade primary and a special secondary school. It is higher grade in virtue " of the standard of the boys which it receives from primary schools; it is " secondary in view of the extent to which the instruction in certain subjects " is carried. Manual work is common to all the pupils of the first year; in the " second and third year it is restricted to those who intend to take up an " industrial career. In the case of boys destined for commercial pursuits, it is " replaced by instruction in silk weaving. This is the only trace of specialisation " which exists at the present time in the school curriculum. In other respects " the authorities have been guided by the principle that the purpose of the " school is not to prepare boys for the exercise of this or that calling, but to " render them capable of succeeding in every calling through the advantages " derived from an active intelligence, a habit of logical reasoning and a comparatively large stock of knowledge, but more especially through that passion " for work which is the peculiar characteristic of members of this school."

Mr. Lang is further quoted to the effect that " the Martinière does not claim " to be an apprenticeship school which provides boys with manual preparation " for definite callings. It is either more or less than that, according to the point " of view taken. It is what may be called an École Professionnelle Générale. " In a school of this kind boys should obtain, besides the indispensable " complement of primary instruction, a stock of special knowledge which may " render them capable of succeeding in any calling, industrial, commercial, or

“ even artistic, according to their abilities. Such instruction will produce
 “ neither turners, mechanics, employés on railways and public works, or
 “ clerks. But the boys who have received it will be superior in any of these
 “ callings to those who have not enjoyed its advantages.”

Such are the views on the work and mission of the Martinière which were held by Mr. Lang in 1883, and to which, in all essential particulars, he still adheres. The new school council, however, which came into office in 1892, decided against them, and appointed the committee whose report we now proceed to consider. In this report the accuracy of Mr. Lang's definition of the part hitherto played by the school is fully recognised. The instruction actually provided may, the committee consider, be regarded in virtue of its scientific element as of a general technical nature (*enseignement professionnel général*). On the other hand it is evidently more general than technical. It contents itself with enabling boys to enter every calling indifferently, but it does not train them practically and positively for the exercise of these callings. The question is whether this is the true part which the school ought to play : whether originally founded, as it was, to satisfy the requirements of trade and commerce, it should content itself with merely leading its pupils to the threshold of indefinite occupations. Ought it not rather to give them a distinctively technical education and thereby prepare them directly for the principal careers which are open to them? No one would wish to deny the just claims of general instruction, but on the other hand it is of the first importance that the services of boys on leaving the school should not only be useful but of immediate use, and for this purpose a genuinely technical training is indispensable. Nor is this a view, the committee contend, which has been hastily formed. It is one which merely accords with the whole tendency of public opinion on the subject of technical education for more than 30 years. It is but the practical realisation of a scheme, which has on various occasions been mooted for giving a more special character to the instruction at the school. Tabureau, to whom the creation of the school is principally due, originally intended it for the practical training of workmen, foremen, and managers. Owing to the backward conditions of primary education at that period, and on other grounds, this scheme was not practicable in its entirety, but had to be limited to the establishment of courses in mathematics, mechanics, and chemistry. To these was subsequently added manual work, which for a long period occupied a predominant position at the school. The addition in 1868 of a third year to the school course was another step in the direction of specialisation, but one which was destined to fail owing to the defective conditions under which it was carried out. Special courses adapted to the requirements of different callings were formed. Amongst these courses, however, boys were allowed complete liberty of choice, a liberty which they were unfitted to exercise. The experience of this system during more than 10 years was on the whole unfavourable. On the one hand the choice made by the boys was often injudicious, and on the other hand the discipline of the school suffered. In 1879 this right of option was suppressed, and the courses of the third year, like those of the first and second, became obligatory. Of the old system the only survival at the present day is the arrangement by which boys at the beginning of the second year may, at the desire of their parents, choose between the theory of weaving and manual work.

Finally, in 1892, a proposal was made by Mr. Lang to the effect that a fourth year should be added to the school course, a year in which special preparation was to be given for the three different branches of industry which the majority of boys usually enter, viz., commerce, chemical industries, and mechanical construction. This proposal of Mr. Lang the school council adopted in principle, but, owing to the expiration of their term of office, did not carry into effect.

The committee consider that the above recital proves incontestably that the authorities who have successively administered the school have always examined this question with the same result, viz., that the instruction given at the Martinière is of too general a character, and that it is indispensable it should be made more directly technical (*professionnel*). The time has now arrived for carrying into effect a reform which two considerations in particular render more urgent than ever. The first of them is the great advance which has been made in primary instruction during the last 70 years. In former

days when such instruction, more especially in science and drawing, was quite unorganised, the paramount claims of elementary knowledge of a general kind left no room for a strictly technical training. At the present day the situation is entirely altered. Not only has the standard of elementary education very much improved, but a new order of schools, those of a higher grade, have been created for the express purpose of completing the *general* instruction acquired at the primary school. Under these circumstances is it the duty of the Martinière to do work which is already provided for by an increasing number of higher grade schools? Is it not rather to fulfil the purpose for which her endowments were originally given, and to provide that technical instruction of which Lyons has long felt the want?

In the second place, it is not only the progress of primary education, but the actual requirements of trade and commerce, which necessitates this conclusion. Technical instruction is not like the teaching at a classical school, fixed and uniform through successive generations. It is essentially special, and to be effective, must remain in touch with the constant fluctuations to which trade and commerce are subject. The apprentices whom a tradesman or industrial employer stands most in need of at the present day, are not those who have received a *general* education, even though such general education may be of a more or less technical tinge, but those whom the actual technical knowledge which they bring with them renders useful at once, or with the least possible delay in some particular trade. An employé who has a thorough knowledge of mechanics, geometry, and drawing is of little use to a merchant; but he is, on the other hand, required to know how to keep books, to understand banking business, or to speak several foreign languages. Again, an industrial employer will trouble himself very little about the commercial acquirements of his foremen and workmen. He will judge them exclusively by the thoroughness of their technical knowledge.

Having thus demonstrated the necessity of introducing some reform, the committee proceed to consider the merits of three different projects which have been put forward. The first proposal was to give a technical character to the teaching from the commencement, and thus to transform the Martinière into a commercial and industrial apprenticeship school (*École pratique de commerce ou d'industrie*) such as exist in various towns in France. These schools provide an exceptionally thorough training, both for the counting-house and the workshop, and enable the boys, on leaving school, at once to earn good wages as clerks or workmen. There were, however, in the opinion of the committee, objections to this course. While holding specialisation in some form or other to be essential, they consider that it should be based on a sound foundation of general instruction. For such general instruction, apprenticeship schools do not appear to offer sufficient guarantee. Though well adapted to form subordinate clerks and workmen, or even foremen, they are less calculated to fit youths for really responsible positions in commerce or industry.

The second project, which has already been referred to, was that of Mr. Lang. He proposed to add a fourth year, to be devoted to distinctively technical preparation, the character of the instruction during the existing three years remaining unaltered. In theory there were strong arguments in favour of a scheme which at once raised the educational status of the school, satisfied the demands of technical specialism, and yet left the general instruction unimpaired. In practice, however, there is, the committee considers, a fatal objection to it. The great majority of the parents who send their children to the Martinière could not afford to spend four years on their education. This is proved by the fact that a large number of the parents withdraw their boys from the school at the end of the second, or even of the first, year. It appears from statistics of the last 10 years (1885-95) that, out of 250 boys who annually enter the school, only 137 pass into the second year's, and only 71 into the third year's course. It is, moreover, quite the exception for French technical schools to have a curriculum of more than three years. In the case of a few schools, like that at St. Chamond, which has a four years' course, it must be remembered that the first year is really preparatory, and is intended to be complementary to primary instruction. In other cases such schools aim at giving a complete training for a limited number of trades, or

even for a single trade, so that the apprentice on leaving school is almost a finished workman. It may be added that the effect of adding a fourth year to the course would be to give boys, whose parents were in easy circumstances, an undue advantage over their poorer comrades, in gaining the leaving certificate of the school. This would be contrary to the popular traditions of the Martinière.

While compelled to reject the two proposals in question, the committee have decided unanimously in favour of a third scheme, which, without effecting any change in the present three years' course, appears, in their opinion, fully to satisfy the paramount consideration of giving boys a really practical training and enabling them to rise to the highest position in their respective callings. It consists in maintaining the existing course of general instruction during the first two years, and in giving to the third year an exclusively technical specialisation.

This decision has met with certain criticisms, to which the committee briefly reply. It has been urged that it compels boys to make premature choice of a definite calling. If the specialisation began in the first year of the course, this objection might be valid. But after two years of general instruction a boy is certainly qualified to choose, if not one particular occupation, yet a definite group of occupations. An opinion has, on the other hand, been expressed that the reduction of the course of general instruction from three years to two must necessarily have a prejudicial effect on the intellectual and moral training of the pupils. In former days there would, no doubt, have been some force in this criticism. At the present day the stock of general knowledge which boys bring with them on entering the Martinière is amply sufficient, when supplemented by a two years' training at the school itself, to serve as a basis for technical instruction. It has finally been objected that a single year of specialisation is insufficient to provide an adequate preparation for a commercial or industrial career; that, for this purpose, a course of at least two years, such as that which the local Higher School of Commerce and the École Centrale supply, would be requisite. This criticism appears to overlook the fact that two years of general instruction precede the specialisation of the third year, and that consequently such specialisation must necessarily be more intense, and fruitful in result, than that of any other establishment.

The principle of specialisation having thus been established, the next question for the committee was to determine the particular objects to which it ought to be applied. The industries of Lyons are too numerous to admit of special preparation in every case; nor, as a matter of fact, do they all require it. The preference must necessarily be given to those which the majority of boys on leaving school usually enter. They are three in number, viz.: (1) commerce; (2) civil engineering (engineering, architecture, mechanical construction, and electricity); (3) chemical industries. Taking this as a starting point, it has been decided to divide the third year into the three sections of (1) commerce and weaving; (2) civil engineering and electricity; (3) chemical industries. In view of the constantly increasing importance of electricity and the important place which the silk industry occupies at Lyons and in the surrounding country, there was much to be said in favour of forming separate sections of electricity and weaving. On further consideration, however, the committee decided to combine electricity with civil engineering, and weaving with commerce generally. At the present day mechanical construction and electricity stand in close relations. The man who is put in charge of a steam engine is expected also to understand the working, setting up, and repairing of a dynamo. Nor has it appeared advisable to draw any sharp distinction between weaving and commerce generally. The future pupils of the commercial section will not be in a position to choose definitely beforehand any one branch of trade. They differ in this respect from the students at the Higher School of Commerce at Lyons, who are, for the most part, sons of manufacturers and tradesmen, and are looking forward to occupying a definite position in their fathers' business. This is not the case with the pupils of the Martinière, who are glad to take any place which may be open to them, whether in weaving or in any other trade. Their preparation must, consequently, be of a general, not of a special, kind. Moreover, a special

course of weaving already exists at Lyons at the Municipal School in the rue Belfort, which is always open to those who wish to give more attention to the subject.

Adhering to the principle that the specialisation of the third year of the course should be rendered as effective as possible, the committee have thought it advisable to eliminate every element which is not directly conducive to that result, such as, for instance, the history of commerce and weaving, a subject which belongs rather to general than to technical education. On the other hand, the most prominent place has been given to those practical subjects which appear to lead most directly to the object in view. Such are English and bookkeeping in the section of commerce, practical work in the section of industrial chemistry, and workshop practice in that of civil engineering and electricity. The subjects comprised in the different sections will be as follows, taking them in the order of their importance:—

- I. Section of commerce and weaving: Book-keeping, English (which is taught exclusively with a view to conversation and commercial correspondence), French and commercial correspondence (the formation of a clear and succinct style being of great importance), weaving, penmanship, articles of trade, commercial legislation, commercial geography, political economy.
- II. Industrial chemistry. This section, of which the principal subject is chemistry, both as a science and in its practical application to industry, will include: (1) A course of chemistry continued throughout the year; (2) Practical experiments; (3) Lectures preparatory to practical work. Subjects accessory to the above are: (1) German language (a knowledge of which the constant progress of chemical research in Germany renders essential); (2) Industrial legislation (a subject common to this and the previous section), including the law affecting patents, &c.; (3) Drawing of machinery as applied to chemical industries; (4) One lecture on physics in each half-year.
- III. Section of civil engineering and electricity. This section, like the last, will include both theory and practice, viz.: (1) Pure mathematics, including an elementary knowledge of the theory of differential and integral calculus, general notions on curves referred to two axes of co-ordinates, properties of tangents and normals, geometrical definitions of speed and acceleration, &c.; (2) Mechanics; (3) Electricity; (4) Descriptive geometry; (5) Civil engineering construction. The practical work will comprise: (1) Practical electricity, including the handling and installation of ordinary apparatus; (2) Practical mechanics, with separate divisions for founding, fitting, turning, and modelling; (3) Drawing of machines and works of construction.

As to the general instruction of the first two years of the course, it will remain as it is, excepting a few alterations which are requisite in order to bring it into harmony with the new syllabus of the third year. These alterations affect; (1) Mathematics, which will now, in the first year, include logarithms, compound interest and annuities, and in the second year spherical geometry, trinomials and the higher parts of trigonometry; (2) Mechanics. The subjects of the second year will include the study of simple machines, friction, and the higher parts of statics. (3) Descriptive geometry, comprising change of position, rotation, projections and plain sections of polyhedra. (4) Book-keeping, with a view to giving boys who subsequently enter the engineering and chemical sections general notions on the subject. (5) History, which will now extend to modern times. (6) Modern languages. English and German will be taught in the second year; the choice between the subjects being left to the parents of boys.

The Report, of which the above is a summary, was presented in June 1895, and was unanimously adopted by the council of the school. A proposal that the new technical sections should be open, not only to members of the school, but also, after examination, to all boys holding the certificates of a higher grade school, or its equivalent, was likewise approved of. The new arrangements were to have dated from the present year, but, owing to the extension of the school buildings, which is still in progress, they will not be complete till October 1898, at an estimated cost of 32,000*l*. This expense will be easily borne by the school, which is one of the richest in the world, and has recently

come into a bequest of about 120,000*l*. The following Tables show the time allotted to the different subjects included in the three technical sections :—

SECTION OF COMMERCE AND WEAVING

Subjects.	Weekly number of Lessons.	Weekly number of Hours.	
		Winter.	Summer.
Book-keeping - - -	5	8.20	10
English - - -	8	8	8.45
French and Commercial Correspondence.	5	6.15	6.15
Weaving - - -	3	5	5.45
Penmanship - - -	3	3	3
Articles of Trade - - -	3	3	3
Legislation - - -	2	2	2
Commercial Geography - - -	2	2	2
Political Economy - - -	1	1	1
Total - - -	32	38.35	41.45

SECTION OF INDUSTRIAL CHEMISTRY.

Subjects.	Weekly number of Lessons.	Weekly number of Hours.	
		Winter.	Summer.
Course of Industrial Chemistry - -	3	3.45	3.45
Practical work - - -	5	13	15
Preparatory Lectures - - -	3	3.45	3.45
German - - -	3	3.45	3.45
Industrial Law - - -	1	1	1
Machine Drawing - - -	2	2	3
Physics - - -	2	2.15	2.15
Preparation and Questions - -	6	9	9
Total - - -	25	38.30	41.30

SECTION OF CIVIL ENGINEERING AND ELECTRICITY.

Subjects.	Weekly number of Lessons.	Weekly number of Hours.	
		Winter.	Summer.
Pure Mathematics - - -	3	3.30	3.30
Mechanics - - -	3	3.30	3.30
Electricity - - -	2	2	2
Descriptive Geometry - - -	1	1.15	1.15
Construction - - -	1	1	1
Industrial Law - - -	1	1	1
Machine Drawing - - -	3	4.30	6
Constructional Drawing - - -	3	4.30	6
Practical { Electrical Fittings - -	2	2.30	2.30
Work. { " Construction - -	2	2.30	3
{ Mechanical " - -	12	12	12
Total - - -	33	38.15	41.45

The above programme is, perhaps, chiefly remarkable for the large demands which it makes on school boys of 15 to 16 years of age. The premises and conclusions of the Committee appear to be most carefully formed, and are in themselves unimpeachable. Their defect appears to lie rather in their application. The desire for specialisation, so strongly and unanimously urged, no doubt expresses a genuine want which has long been felt at Lyons. Such a want, however, can hardly be satisfied by an attempt to graft an engineering and industrial college on a higher grade school. A secondary technical school, which boys would enter, not leave, at 15 or 16 years of age, might better answer the purpose.

It is evident from what has preceded that the new arrangements do not meet with Mr. Lang's approval. In his opinion the two years to which the course of general instruction has now been reduced are inadequate for the purpose. The requirements of technical specialisation should have been provided for by the addition of a fourth year. To specialise the third year is, he considers, a great mistake, for, even supposing that a lad of 16 can be a competent chemist, engineer, or electrician, his mind is necessarily still unformed, and it is certain that no employer is likely to entrust any serious business to his care. He must become a man before he can be a specialist. Nor are Mr. Lang's views in harmony with the general tendency of technical education in France. He disapproves on principle of trade schools, or, according to the current phrase, *l'atelier dans l'École*. Such a system, he considers, sets theory and practise at variance in the mind of the apprentice, and inevitably leads him to neglect one or other of two rival interests. Schools like the *École Diderot*, and all apprenticeship schools, are in his opinion a mistake, because a trade can only be learnt properly in a real workshop.

In France there are two distinct schools of opinion, one of which is in favour of the "school in the workshop," while the other advocates the "workshop in the school." Of the former system there is an instance at the great works at Creuzot, whilst the latter is represented by the *École Diderot*. In both systems, according to Mr. Lang's view, one part of the curriculum is pursued at the expense of the other. To maintain an equilibrium between the two is impossible. The school at Creuzot is excellent from a technical point of view, but is defective so far as general education is concerned. Moreover, it is only in very large works where such an arrangement is even possible. With regard to the system prevailing at the *École Diderot*, Mr. Lang's views have already been referred to. Mr. Lang fully admits the evils of trade apprenticeship in the form in which it too often exists. Even under favourable circumstances, much of the time spent by the apprentice is entirely wasted from a technical point of view. During the first year his duties chiefly consist in sweeping out the shop and running on errands. In other cases, such as appear to be very common in France, the workshop is a school, not of technical instruction, but of moral corruption. A satisfactory solution of the problem is, therefore, a most difficult matter. Of one point, however, Mr. Lang feels assured. In a technical school of the primary grade the general portion of the education should be the predominant one. There should be no pretence of turning out finished apprentices, such as the workshop alone can produce. The chief object should be to discover the technical capabilities of a pupil and direct him towards certain crafts. In addition to this, an equipment of theoretical instruction should be provided, which, after the practical knowledge of a trade has been thoroughly mastered in the regular apprenticeship of a workshop, will produce really capable workmen. It is, furthermore, of great importance that local authorities should not lose sight of the boys on their leaving the higher grade school. The object should be not only to make them retain the knowledge there acquired, but to diminish, as far as possible, the admitted evils in the life of an apprentice. This is most effectually achieved by carefully organising a system of evening classes, such as that of the *Société pour l'enseignement industriel du Rhône*, in which Mr. Lang has so long taken an interest. For boys who are to be workmen the instruction of the primary, as distinguished from that of the higher grade school, is sufficient, provided they are able to retain and develop their knowledge by means of such evening instruction. In this connection Mr. Lang approves in principle of the instruction supplied by the London polytechnics.

With regard to manual work in French primary schools, Mr. Lang considers that there has been no advance, but rather retrogression since 1884, a fact due to the exaggerations which were imported into the movement. It is a good thing, he considers, to teach manual work during the last year of the primary school course, not as a training for a definite trade, but merely as enabling an opinion to be formed as to what trade a boy has most aptitude for. To introduce actual technical instruction into rural schools would, he thinks, be a great mistake, as it would only increase the existing tendency of migration from the country into the town.

Mr. Lang's great experience necessarily gives an interest to his views, though these are in most respects diametrically opposed to the present tendency in France. They are, no doubt, to some extent effected by circumstances which are local and peculiar. The system of technical education contemplated by Mr. Lang, which is merely preparatory and complementary to, and in no way a substitute for, a trade apprenticeship, is no doubt one for which Lyons, with its many industries, offers exceptional facilities. By means of the extensive organisation of the Société pour l'enseignement industriel du Rhône, Mr. Lang has himself worked powerfully towards carrying such a system into practical effect. Yet it is in Lyons itself, in a school of which he is director, and which stands in close relation with the chief industrial interests of the city, that a body of experts has unanimously decided in favour of trade teaching. Such a fact can only be accounted for by an impatience, whether justifiable or not of past methods and results. Even Mr. Lang is in favour of the principle of specialisation, though not of the proposed scheme of which the ambitious nature may be aptly characterised in the words of another authority, himself the head of an important establishment at Lyons, "C'est la grenouille qui voudrait se faire bœuf."

ROUEN.

ÉCOLE PRIMAIRE SUPÉRIEURE PROFESSIONNELLE.—At the time of the visit of the Royal Commission this school went under the name of École Municipale Professionnelle. Shortly after that date it was officially classed as an École Primaire Supérieure, retaining, however, the title of Professionnelle, which has been associated with it since its foundation in 1849. It may at the present moment be regarded as an exceptionally good specimen of those schools which, hovering half way between purely general instruction and trade apprenticeship, aims at satisfying the ordinary requirements of an industrial county town. It stands in contrast, and to some extent, in rivalry with another school at Rouen, the École Pratique d'Industrie, with which it is sometimes confounded, even by parents, who do not at present appreciate the exact distinction existing between the schools, both of which offer an Enseignement Professionnel. In the eyes of an École Pratique, however, a higher grade school, however deep the technical tinge which it may assume, can never be anything but "tout bonnement École Primaire Supérieure." In 1886 the school was transferred to its present handsome quarters in the rue St. Lô, raised, with the assistance of the Ministry of Public Instruction and the Department, at a cost of 22,000*l*. They include a chemical laboratory, a lecture hall capable of seating 300 boys, and an industrial museum. The fitting room contains 100 vices, 10 lathes for turning metal, two slide lathes, &c. The carpentering room has 80 benches and five lathes. The room for Industrial and Art drawing has accommodation for more than 160 pupils. Within the school is a very large court, 2,000 square metres in extent. As an École Primaire Supérieure de plein exercice, the school provides in the second and third year commercial and industrial as well as general instruction. The latter is especially adapted for boys who intend to enter primary training colleges. The commercial section, in which both English and German are taught, prepares for the higher schools of commerce, and, amongst other things, for the Bourses de Voyage and Bourses de séjour à l'étranger, Government Scholarships, as to which a few details may here be given. They were instituted by the Ministry of Commerce with a view of promoting French manufactures abroad, and are open to all technical schools, as well as to certain others which are recognised by the Ministry as being of an industrial character. The Bourses de Voyage, for which candidates are eligible between the ages of 21 to 30, are of the value of 60*l*. to 120*l*., and are renewable for a second or third year. The Bourses de séjour à l'étranger, founded in 1886, are of two kinds: (1) for youths of 16 to 18, who

desire to settle in foreign countries, and who, if they remain abroad up to the age of 30, are dispensed from military service. These scholarships are worth 160*l.* for the first and 120*l.* for the second year, and may be renewed for a third year. (2) For candidates up to 26 years of age who hold the certificate of a higher school of commerce. For Europe, Tunis, and Algeria these scholarships amount to 100*l.* for the first and 80*l.* for the second year, but in case of residence in other countries they are of greater value.

The Industrial Section of the École Professionnelle gives special training for the Écoles d'Arts et Métiers, for the school at Cluny, and for marine engineering and agricultural schools. The manual work occupies 8 to 10 hours a week, as against the 4 to 6 hours officially prescribed for the ordinary École Primaire Supérieure. It is given by five master workmen, who are selected for the post by a competitive examination which is said to be very severe. Their salaries, which are paid by the town, vary from 24*l.* to 60*l.* per annum. They teach both theory and practice, the other teachers taking no part whatever in this subject. In 1886 courses on Spinning, Weaving, and Mechanics were introduced. They were taken over from another school at Rouen, one of the two visited by the Royal Commission, the École Supérieure du Commerce et de l'Industrie, which gradually declined and has now ceased to exist. The new subject did not meet with any better success at the École Professionnelle, and in 1892 was given up altogether. The failure of the École Supérieure du Commerce et de l'Industrie is attributed to the fact that it met with no support from manufacturers, but was exclusively frequented by the sons of workmen and foremen. The school at Elboeuf, for the manufacture of cloth, is said at the present time to be suffering from the same condition of things.

In 1893 the École Primaire Professionnelle was attached to the Ministry of Commerce as an École Pratique de Commerce. This arrangement lasted a year, but was given up owing to the strong desire manifested by the town to retain an École Primaire Supérieure providing special preparation for the Écoles d'Arts et Métiers. Accordingly the school was in this capacity finally attached to the Ministry of Public Instruction.

In 1896 a higher school of commerce was founded at Rouen, and the École Primaire Supérieure made over to it some of the commercial instruction which it had inherited from the defunct École du Commerce et de l'Industrie previously mentioned. The new Higher School of Commerce, which has at present 35 pupils, is said to be doing well. Its success is, no doubt, to some extent due to the fact that its pupils, like those of all schools of this type, enjoy an exemption of two years' military service.

The pupils of the École Professionnelle are said to belong to a higher social class than those who frequent the École Pratique at Rouen. The latter usually remain workmen, whereas those of the École Professionnelle rise to be foremen or managers. It will, however, be observed from the account of the local École Pratique that this statement of the case may be called in question. The following table for which with other information I am indebted to the Director of the École Professionnelle, shows the occupation taken up by 95 boys who passed out of the school in 1896 :—

Industrial	-	-	-	-	-	26
Trade (earning 24-48 shillings a month)	-	-	-	-	-	23
Agricultural	-	-	-	-	-	4
School at Chalons	-	-	-	-	-	3
Higher School of Commerce, Rouen	-	-	-	-	-	9
Other schools	-	-	-	-	-	8
Ponts et Chaussées	-	-	-	-	-	3
Banks	-	-	-	-	-	3
With notaries or attorneys (said to be bad boys !)	-	-	-	-	-	3
Customs	-	-	-	-	-	2
Railways	-	-	-	-	-	2
Post Office	-	-	-	-	-	1
Unknown	-	-	-	-	-	8

95

There are at present about 240 boys at the school. 26 scholarships of the value of 16 to 20*l.* each are provided by the State and the Department, and six of 16*l.*, by the town.

ÉCOLES PRATIQUES DE COMMERCE OU D'INDUSTRIE.

(UNDER ONE MINISTRY.)

Some information has already been given as to the chief characteristics of these schools and the object with which they were formed, in 1893, into a distinct category under the immediate and exclusive jurisdiction of the Ministry of Commerce. They are the lineal descendants of the abortive Écoles d'Apprentissage, but under a new name intentionally chosen, as one less likely to arouse the susceptibilities of the French middle classes to whom the associations of the word "apprentissage" are unpalatable. Sufficient time has not yet elapsed since the introduction of the new type of school to make it possible to say whether these susceptibilities are likely to be allayed. The feeling in France in favour of a "general" education, the education which, according to the favourite expression, "fait l'homme," is very strong, so strong that the mere fact of the Écoles Pratiques having been established almost in spite of it is in itself a clear indication of their industrial necessity. At the present time, however, the Écoles Pratiques are frequented almost exclusively by the sons of workmen and clerks. Manufacturers and tradesmen, who object in any form to gratuitous education and its usual adjuncts, usually prefer to give their children a secondary education at a lycée or collège. In the few instances where boys of the middle class go to an École Pratique for special instruction, as, for instance, at Rheims, for weaving and chemistry, they pay a fee and are taught separately.

The subjects of instruction in the Écoles Pratiques d'Industrie have already been referred to. They appear in detail in the official model syllabus, in which also the exact scope of each subject and the methods of instruction to be pursued are carefully determined. To this syllabus, which is not obligatory, but only intended as a standard, most of the schools adhere pretty closely in framing their special programmes. The subjects of industrial and commercial instruction are as follows:—

ÉCOLES PRATIQUES DE COMMERCE.

	Weekly Number of Hours.		
	1st Year.	2nd Year.	3rd Year.
I.—COMMERCIAL.			
Commerce, book-keeping, &c.	6	6	6
Foreign languages	6	6	6
Arithmetic and algebra	3	3	3
Geography	1½	3	3
Writing	3	1½	1½
Chemistry and articles of trade	1½	3	3
Mercantile law	—	—	3
Commercial economy	—	—	1½
	21	22½	27
II.—GENERAL.			
French	4½	3	3
Drawing	1½	1½	1½
History	1½	1½	—
Natural history and hygiene	—	1½	—
Geometry	—	1½	1½
Physics	1½	—	—
	9	9	6
Preparation	9	9	9
Total	39	40½	42

ÉCOLES PRATIQUES D'INDUSTRIE.

	Weekly Number of Hours.		
	1st Year.	2nd Year.	3rd Year.
I.—INDUSTRIAL.			
Workshops - - - - -	30	30	33
Drawing - - - - -	6	6	6
Geometry - - - - -	1½	1½	1½
Mechanics - - - - -	—	—	1½
Industrial economy - - - - -	—	—	1½
	37½	37½	43½
II.—GENERAL.			
French - - - - -	3	3	1½
History - - - - -	1½	1½	—
Geography - - - - -	1½	1½	—
Natural history and hygiene - - - - -	—	1½	1½
Physics - - - - -	1½	1½	—
Chemistry - - - - -	—	1½	1½
Arithmetic - - - - -	1½	1½	1½
Accounts - - - - -	—	—	1½
	9	12	7½
Preparation - - - - -	9	9	9
Total - - - - -	55½	58½	60

The official syllabus is accompanied by a statement of the reasons which have induced the Ministry of Commerce to create this new order of school. It is pointed out that the old system under which, in a less competitive age, apprentices used to be taught a definite craft in a workshop no longer exists. Cheap and rapid production are the key words of modern trade. This entails subdivision of labour, which, again, under ordinary conditions, precludes the possibility of any deeper insight or intelligence on the part of the workman. It has, therefore, become necessary to supply the requisite instruction in schools, where boys may learn both the theory and practice of a trade with sufficient completeness to give their services an immediate market value. If they are to acquire the degree of efficiency which will, after a short experience of a trade workshop, enable them to earn the wages of an ordinary workman, they must necessarily spend a large part of their time in the school workshop. Though their experience here will be restricted chiefly to ordinary tools and hand machines, they will soon learn, on entering a real workshop, to manage instruments of greater complexity. The minimum of hours which a boy must spend in the school workshop in order to give him the requisite manual skill is 25 to 30 a week.

The following is a list of the principal Écoles Pratiques, commercial and industrial:—

ÉCOLES PRATIQUES D'INDUSTRIE ET DE COMMERCE.

	Number of Pupils.	
	Industrial Section.	Commercial Section.
Boys.		
Agen - - - - -	68	77
Fourmies - - - - -	76	58
Grenoble - - - - -	222	102
Limoges - - - - -	90	80
Le Mans - - - - -	66	40
Nîmes - - - - -	104	92
Reims - - - - -	155	46
Romans - - - - -	50	16
GIRLS.		
Le Havre - - - - -	155	85
Nantes - - - - -	50	82
Saint Étienne - - - - -	102	67

ÉCOLES PRATIQUES D'INDUSTRIE.

Boys.

Brest - - - - -	120 pupils.
Boulogne-sur-Mer - - - - -	80 "
Le Havre - - - - -	228 "
Montbéliard - - - - -	81 "
Morez (Jura) - - - - -	41 "
Rennes - - - - -	55 "
Rouen - - - - -	157 "
Saint-Chamond (Loire) - - - - -	75 "
Saint-Didier-la-Seauve - - - - -	22 "
Saint-Étienne - - - - -	294 "

ÉCOLE PRATIQUE DE COMMERCE.

BOULOGNE-SUR-MER.

Boys, 89.

By the provisions of the decree of February 1893, the regular teaching staff of these schools is paid by the State. The ordinary workmen, on the other hand, are paid by the communes or departments. These also provide the school building with heating and lighting and the teaching plant, and are, moreover, obliged to furnish members of the staff with a lodging, or in lieu of this with an indemnité de résidence, the amount of which is estimated according to the population of the town. In this respect the Écoles Pratiques are subject to the same regulations as the Elementary and the Higher Grade Schools. The annual Government grant to the Écoles Pratiques amounts at the present time to 16,600*l.* The expenses incurred by the communes amount, I am informed, to about the same figure.

ROUEN.

This school was founded in 1878 under the name École d'Apprentissage, but it was not one of those visited by the Royal Commission. In 1887 it was transferred to the present handsome building in the rue des Emmurées, which were erected by the town at a cost of about 20,000*l.* The accommodation and the general arrangements are excellent—the best and most worthy of imitation of any which I saw in French primary technical schools. There are three principal workshops; the first, for fitting and turning, measures 60 metres by 10; the second, for locksmithing, 30 metres by 10; the third, for carpentering, also 30 by 10. The class rooms are all very large and lofty. The machinery is driven by steam throughout. The instruction is confined to wood and iron, the whole of the three years' course being spent in one or other department. There are about 250 boys, who are admitted at 12 years of age if they have the primary leaving certificate, or in lieu of this they may, at 13 years of age, pass an entrance examination. At the end of the third year they receive, after examination, the Certificat d'études pratiques industrielles.

The working day of the school is thus divided:—

7 to 8.30 a.m.	-	-	Drawing.
8.45 to 9.30 a.m.	-	-	Preparation.
9.30 to 12 noon	-	-	Workshop (including for the 1st and 2nd year), 2 hours a week in Technology.
1.30 to 3.45 p.m.	(1st and 2nd year).	-	Workshop.
1.30 to 4.30 (3rd year)	-	-	Workshop (Saturdays, 1.30 to 3.45).
4 to 6 (1st year)	-	-	French, 2 hours; History, 1 hour; Arithmetic, 2 hours; Geometry, 2 hours; Geography, 1 hour; Physics, 2 hours; Chemistry, 1 hour; Hygiene, 1 hour.
4 to 6 (2nd year)	-	-	French, 2 hours; History, 1 hour; Arithmetic, 2 hours; Geometry, 2 hours; Geography, 1 hour; Physics, 2 hours; Chemistry, 1 hour; Hygiene, 1 hour.
4.45 to 6 (4 to 6, Saturdays) (3rd year).	-	-	French, 1½ hours; Industrial Economy, 1½ hours; Arithmetic, 1½ hours; Geometry, 1 hour; Physics, 1½ hours; Mechanics, 1½ hours; Book-keeping, 1 hour.

All the classes are obligatory. There is no half-holiday on Thursdays, as is the case in most French schools. Intermediate examinations take place at the end of the second and third years. The teaching staff consists of nine technical instructors, three teachers of drawing, and four (including the Director) of general subjects. The Government grant for salaries amounts to about 500*l.* per annum. The other expenses, about 1,200*l.* per annum, are paid by the town. There are four Government scholarships of 20*l.* each. The boys are allowed to execute a few orders for the town and for private persons. The money value of such work is distributed in prizes to boys of the second and third years. On leaving the school most of the boys find employment in the town or neighbourhood.

The Director of the school expressed the opinion that the former industrial condition of towns like Rouen fully justifies the creation of the new order of Écoles Pratiques. The old system of workshop apprenticeship was totally inadequate to meet modern requirements. It left an apprentice quite ignorant of drawing and incapable of executing work from a dimensioned sketch. On the other hand the evils of *Déclassement* amongst boys of the Écoles Primaires Supérieures had attained such dimensions that these schools had to find a remedy for it in the creation of special sections for commercial, industrial, and agricultural subjects. All higher grade schools have now a *teinte de travail manuel*, though, as a matter of fact, manual work for four to six hours a week, or even for two hours a day, is totally inadequate as a preparation for real apprenticeship. Formerly, the boys of the Écoles Primaires Supérieures were not only ignorant of all practical work, which they disdained, but even of theoretical subjects they only had a smattering. They were useless in business



because they did not understand how to keep accounts. Hence they found the greatest difficulty in finding any occupation. At the *Écoles Pratiques* the greatest attention is given to drawing as the essential basis of all practical work, and every apprentice thoroughly understands how to "read" a sketch. There is, the Director thinks, a consensus of opinion amongst French industrial employers that the formation of a new class of workmen, educated and intelligent, and in sufficient number to prevent their placing a prohibitive price on their work, is necessary to the prosperity of French industry. Indirectly, the law of 1893 favoured the creation of such a body of workmen in the *Écoles Pratiques* by forbidding the employment of boys under 13 years of age in trade workshops, and by limiting the work of boys over that age to a certain number of hours. Hence employers are more favourable to the training of material which they cannot at once utilise.

RHEIMS.

The school which, under the name of *École Professionnelle Municipale*, was visited and specially commended by the Royal Commission is now known as the *École Pratique de Commerce et d'Industrie*. The course of its development serves to illustrate one of the weaknesses necessarily inherent in municipal industrial schools, viz., that their prosperity and usefulness are dependent on the fluctuations of local trade. Rheims has, it is said, suffered considerably in late years from the competition of other manufacturing towns like Roubaix, her rival in the wool trade. The consequent decline of business has necessarily told on the school, which was originally designed to meet the manufacturing requirements of the town and surrounding region. The mere fact that so important a school, especially created in the interests of a manufacturing community, should have been converted into an *École Pratique* is in itself an indication of the change which has taken place, for, as already explained, it is not the sons of manufacturers and tradesmen who usually frequent the *Écoles Pratiques*, but those of workmen and clerks. The alteration in the character of the school, though of course sanctioned by the local authorities, has not taken place without a certain amount of friction, both between the town and the Ministry, and in the Town Council itself, where opinions are much divided as to the type of school which is most required. In its outward organisation, which includes full courses on weaving, spinning, and practical chemistry, with workshops, laboratory, and every requisite appliance, the school still retains the manufacturing element which formerly distinguished it, and which the school prospectus still puts very prominently forward as constituting a claim to the support of the manufacturing trades of the town. Such a manufacturing element is perfectly legitimate in an *École d'Industrie*, which is expected in all cases to adapt itself to local requirements. The curriculum of the *École Pratique de Commerce et d'Industrie* at Saint-Étienne, which has a four years' course, is still wider than that at Rheims, and includes, besides weaving, the manufacture of arms, industrial electricity, and modelling and sculpture. But such subjects, due to the initiative of the town, are not, like ordinary wood and metal work, an essential part of the school course. Though conspicuous on paper, and actively encouraged by the school authorities, the manufacturing section at Rheims practically plays an unimportant part, and appears to be even in danger of extinction for want of the necessary pupils. On the other hand it should be stated that, in the opinion of the Director, an improvement of trade would do much to revive it.

The present number of pupils engaged in this department is very small. In the weaving shop, which contains 19 hand and four power looms, only six or seven boys of the third year are occupied. The chemical laboratory is used only by three boys of the third year, who do practical work for 26 hours a week with a view to becoming assistants in dyeing, chemical, or sugar manufactories. There is very little demand for apprentices in the dyeing trade, and at the school not one boy in 30 learns dyeing at all. Though chemistry is taught as a subject throughout the school, the practical experiments, in which formerly the whole school took part, are restricted to a very few boys. The great majority are engaged in iron and wood work, more especially in the former, in which five times as many are employed as in the latter. They make

definite choice, at the end of the first year, of one or other of the shops, which include one for fitting, one for founding and boiler-making, one for carpentering and model-making. The Director mentioned it as a striking fact that, though the staple industry of Rheims is weaving and spinning, and not mechanical construction or ironwork, parents, as a rule, send their children to work at the latter and not the former. This is attributable both to the decline of textile industries and to the feeling that for boys, who have passed through the school workshops, there is a fair prospect of obtaining work on the railway. It is, probably, also due to the fact that the school, though the council includes one or two of the leading manufacturers, including Mr. J. Holden of the well-known firm, is no longer in touch with the chief industries of the town. The great manufacturers are, no doubt, able themselves to train the special apprentices whom they may require. A certain loss of patronage may be accounted for by the conversion of the school into an *École Pratique*, a change which would not only, to some extent, affect its social status, but diminished the amount of general instruction in favour of workshop practice. At the time of the visit of the Royal Commission the manual work only occupied 10 hours a week, as against the present 26. Owing, on the one hand, to the inadequate support now received from manufacturers, and on the other to the scarcity of local ironworks, considerable difficulty is experienced in finding occupation for boys on leaving the school. Though probably destined ultimately to become an *École Pratique* of a more restricted type, the official programme has not so far been adopted in its entirety. The weekly number of hours of workshop practice for each year's course are respectively $13\frac{1}{2}$ to $14\frac{1}{2}$, $17\frac{1}{2}$ and 26, as against the 30, 30, 33 of the official syllabus. In other respects the divergence is slight, except that at Rheims algebra and technology are taught as additional subjects, and that the total weekly number of hours is rather less, being $50\frac{1}{2}$ for the first and second years, and $54\frac{1}{2}$ for the third. On the commercial side of the school, which was originally founded by the municipality in 1885, for training clerks with a knowledge of book-keeping and commercial correspondence, $4\frac{1}{2}$ to 6 hours a week are given to German or Spanish, as well as 6 hours to English. On the other hand, French only occupies $1\frac{1}{2}$ hours a week, and there is no provision for drawing, natural history and hygiene, geometry, or physics. One and a half hours a week are, however, spent on shorthand, a subject not mentioned amongst those officially recommended. The total number of hours a week are $50\frac{1}{2}$ in each year's course, as against the official 39, $40\frac{1}{2}$, and 40.

A special section of the school, which, amongst other subjects, spends $4\frac{1}{2}$ hours a week on geometry and 12 hours in workshop practice, prepares for the *Écoles d'Arts et Métiers*, Cluny, and the marine engineering schools. Of 87 boys sent up between 1889 and 1894, 63 qualified and 38 were definitely admitted. In 1895, 10 out of 15 qualified.

The Director expressed the opinion that there was a general tendency in France at the present time towards the creation of *Écoles Pratiques*. Personally, he would like to see all the *Écoles Primaires Supérieures* converted, either into *Écoles Professionnelles*, or into *Écoles Pratiques*. He considers that the efforts made some years ago to introduce manual instruction into primary schools has not been a success, and that in higher grade schools the present system of manual work, while it no doubt helps to develop individual taste, is, after all, only "a sort of amusement." At his own school the number of hours at present spent in workshop practice represents the minimum amount which can be said to be of any practical use. It would be better, he considers, to increase the school course by a fourth year, which would be devoted to genuine apprenticeship. To form real apprentices in three years is, he considers, under any circumstances, impossible. On leaving a school like Rheims a boy ought to spend at least a year in a trade shop before he can be considered a workman.

The institution of the *Écoles Pratiques d'Industrie*, as an official type of school, has evoked a certain amount of criticism to which brief reference may be made. It has been urged that while, on the one hand, the general education which an *École Pratique* affords is sufficiently good to induce a boy on leaving school to give up the workshop altogether, and to join the great army of clerks, the school apprenticeship itself is practically defective. With regard to these two points the present Director of the *École Pratique* of

Saint-Étienne, gives his views as follows :—He declares that an experience of 15 years has proved that, both at Saint-Étienne and at a similar school at Saint-Chamond, nearly all the boys who have left after a course of three or four years have entered workshops or manufactories as workmen or draughtsmen. Their chief desire has been to find a good workshop in which to continue their apprenticeship. In such employment they always hold their own. They are distinguished by the habits of obedience and conscientiousness which they have learned at school, and, as a rule, they finish their apprenticeship in the school which they enter. The second objection is based on the assumption that an apprentice cannot be trained properly except in a trade workshop under the immediate eye of a workman who is actively engaged in producing. But this view rests on an ideal of trade apprenticeship which is purely imaginary, which conceives of a model apprentice, docile and laborious, under the fostering care of an able workman, skilled in imparting knowledge, and eager to give his charge every possible opportunity for self-improvement. But this picture is greatly overcharged. Only too often the apprentice, far from being earnest and studious, is inattentive and careless, fond of variety, and consequently quite incapable of enduring the monotonous routine of a ten hours' working day. His instructor, on the other hand, may be a competent workman, but what guarantee is there that he has either inclination or capacity for teaching? Even if he possesses both, there is little reason to assume that he will devote the moments, when he is not occupied with his own work, to a lad who is probably a complete stranger to him? Or, again, is it to be supposed that the work of an apprentice is presented to him with any regard to the variety or the gradation of difficulty which his education really requires? On the contrary, in most cases, his master will teach him to produce as rapidly as possible, by employing him for long periods at the same kind of work as a useful hand, and, in some cases, as a mere labourer. Very different are the conditions of a trade school. Here the apprentice is not a hand, but a pupil. His instructor is expected not only to be an exceptionally able workman or foreman, but to possess some aptitude for teaching. His business is not only to exact work, but to explain the best way how to set about it. As he is under no obligation to produce for the trade, he has ample leisure to adapt every task, in point both of difficulty and variety, to the requirements of his pupil. The three, four, five, or six hours which a boy spends in the school workshop exposes him to no undue strain. He can, consequently, give his whole strength to his work. Nor is there much point in the objection that a healthy spirit of emulation is likely to be stronger in a trade workshop than at school. An apprentice is, on the contrary, more likely to be excited to emulation by the work of a school fellow of his own age than that of a finished workman.

Another important advantage which a school possesses over a workshop is that, in addition to the requisite skill of hand, it makes provision for the theoretical knowledge which enables an apprentice to read a sketch, to grasp details of construction, and to be perfectly familiar with the various arithmetical and geometrical formulæ which are, at the present day, the necessary stock-in-trade of every good workman. For such purposes evening classes, though very useful in their way, are quite inadequate. After a long day's work an apprentice is too much exhausted to spend, with much advantage to himself, several hours in listening to lectures and in devoting to them the preparation which can alone render them profitable.

Other and more radical objections to the *Écoles Pratiques* in their present form are suggested by M. René Leblanc, whose views on manual instruction have already been referred to. He points out that the law of January 1892, which directs the conversion into *Écoles Pratiques* of those *Écoles Primaires Professionnelles*, "of which the instruction is principally commercial or industrial," has certain disadvantages, for it may, in some cases, have the practical effect of turning a technical higher grade school, which has hitherto been the common property of a locality, into the monopoly of a particular clientèle. Such would be the case of a school in which of the 40 or 50 boys who annually left it, only half the number entered commercial or industrial pursuits. What provision, M. Leblanc asks, would an *École Pratique* make for the other half who are to be employed at home, to go to secondary technical schools, or to occupy subordinate positions in Government offices? Or, to take the instance

of a school of 300 boys, for one-third of whom the technical standard of an École Professionnelle is best adapted, while the wants of the other two-thirds would be adequately provided for by an ordinary École Primaire Supérieure with the usual industrial sections. It would, in M. Leblanc's view, be as unreasonable to convert such a school into an École Pratique, as it would be to deprive it entirely of all technical teaching, the only difference being that in the one case the interests of one-third and in the other of two-thirds of the school would be sacrificed. There must always be a considerable proportion of the parents who neither desire to send their children to a secondary school nor wish them to spend 30 hours a week in wood or iron work, and are yet anxious to give them the advantages of a higher grade education. It is only in the few cases where two higher grade schools exist in the same locality that this difficulty is not felt. The small resources which the State has at its disposal for higher grade instruction, whether of a general, technical, or of a strictly trade order, ought to be equitably distributed. M. Leblanc shows by statistics that of half a million boys born in France in the same year, about one-fourth enter industrial occupations, but of them only one-fourth *i.e.*, one-sixteenth of the whole, are occupied in wood and iron work. There are important towns in which the carpenters, turners, locksmiths, fitters, and mechanics do not amount to one-twentieth of the working population. The principle of creating special schools, or "types purs," for each branch of trade, is, M. Leblanc considers, not in accordance with the proper function of higher grade technical education, which ought to be the possession of the nation at large, not of a few dozen masters and a few hundred boys. For this purpose the instruction of a technical school ought to proceed on parallel, not on divergent, lines, especially when a locality has only one school at its disposal. The best solution of the problem would, therefore, in M. Leblanc's opinion, be to place an École Pratique and an École Primaire Supérieure, with industrial sections, in close juxtaposition, the one portion of the school providing an industrial or commercial training, the other preparing for the secondary technical schools, a few industries of a more general nature, and for agriculture. One of these twin schools would be under the immediate jurisdiction of the Ministry of Commerce, the other under that of the Ministry of Public Instruction, the Director alone being appointed jointly by the two Ministries. Friction between these two authorities would thus be avoided, and the proper development of the school would be secured.

M. Leblanc's views on the Écoles Pratiques, schools under the exclusive jurisdiction of the Ministry of Commerce, acquire additional interest from the fact that they are those of an official of the Ministry of Public Instruction. They cannot, however, be accepted without considerable reservations, as they appear to rest on a misconception both of the circumstances which called the Écoles Pratiques into existence and of the part which these schools are now called upon to play.

If the creation of the Écoles Pratiques admits of any justification at all, they must be regarded, not merely as a new type of school parallel to, and equal with, the types already existing, but as the embodiment of a new industrial policy demanded by the interests of the nation. The objection that they do not in all cases provide the particular type of higher grade instruction which is in greatest local demand to a certain extent begs the question, for they are essentially pioneer schools intended just as much to form as to follow public opinion, and designed especially as an antidote to the *Déclassement* for which the Écoles Professionnelles have, as a body, been held responsible. The fact that there is, at the present time, a greater demand in many towns for a vaguely technical education than for a definitely practical one is not in itself conclusive, for it is this very condition of things which it is one of the principal objects of the Écoles Pratiques to remedy. That local demand and national interest are not always synonymous terms is proved by the complete failure of the majority of the Écoles Professionnelles to provide a technical education in any way adequate to the needs of modern trade. The Écoles Pratiques are a corrective to a policy long continued in spite of its evident futility, a policy which municipalities are only likely to abandon in obedience to pressure applied by a central authority whose aim is to study rather the industrial interests than the social prejudices of any particular locality. Not that there can be any question of compulsion. Each town has practically free choice in

the matter by the fact that the school buildings and their appurtenances, as well as the indemnité de résidence of the teachers, can be voted or withheld by the municipality. If any town council is really satisfied with the results of a local École Professionnelle, they are under no obligation to convert it into an École Pratique. At the present moment the number of the Écoles Pratiques bears but a small proportion to that of the Écoles Primaires Supérieures, or even of the Écoles Professionnelles. Of the former, the total number, so far as boys' schools are concerned, is officially given as 188. The Écoles Professionnelles, including all those of a public order, though not coming under any official category, number about 60. The relative numerical inferiority of the pupils who at present attend the Écoles Pratiques is, however, of less importance than M. Leblanc appears to consider it. A school, whether literary or industrial, if it deserves the name of school, is of far less importance in virtue of its numbers than of the standard which it creates and the example which it sets. A well-drilled body of 1,000 workmen and clerks annually thrown on to the market must have a very considerable influence on the commercial and industrial interests of a country.

To the actual scope of the Écoles Pratiques, M. Leblanc appears to do less than justice. They are by their constitution expressly designed to include not only industrial but commercial pursuits, which in conjunction may be regarded as offering a very considerable range of usefulness. If the separate existence of higher schools of commerce is justifiable, there appears to be the less reason for condemning schools of greater scope. It must also be remembered that the Écoles Pratiques provide special preparation for the secondary technical schools, a fact which M. Leblanc omits to mention. Moreover, as already pointed out, in the case of the school at Rheims and Saint-Étienne, it is quite within the competency of an École Pratique to include any manufacturing element which may exist in a town. The objection which M. Leblanc has to specialised schools, so far as schools embracing so many elements can be considered special, may be justifiable in the abstract, but the fact remains that the general tendency of trade schools, as of trade itself, is necessarily towards some form of specialisation. As to the question of an equitable distribution of the money voted in aid of higher grade instruction, it is hard to see why the State should *a priori* be under any obligation to distribute it in any given proportion to different types of school, whether those types are or are not, equally in harmony with the object which the grant itself is intended to secure. There can be no question of an inherent right possessed by any part of the population to gratuitous higher grade instruction, nor, consequently, to any particular form of it. Higher grade instruction in France is essentially a special gift, over and above primary education, reserved for an aristocracy of merit which is recognised and selected by competition. It would certainly appear to be more to the interests of the country that, of the public money gratuitously devoted to the continuation of primary education, a greater proportion should be spent on teaching the working classes at an early age to earn their own living, than on an indefinite training which has already been proved by experience to be barren in results.

With regard to the joint control by two Ministries of the dual schools, which M. Leblanc advocates, it need, in conclusion, only be observed that the principle of a condominium is one which has proved ineffectual in the past, which has been abandoned in the case of the Écoles Pratiques, and which is not likely to be revived, even in a modified form, in any scholastic organisation of the future.

SECONDARY TECHNICAL EDUCATION.

ÉCOLES NATIONALES D'ARTS ET MÉTIERS.

AIX, ANGERS, AND CHÂLONS.

The original purpose of the Écoles d'Arts et Métiers, and their success in achieving even more than that purpose, were aptly characterised by President

Faure in a speech delivered two years ago to an assembly of past members of these schools. Though originally only designed, as he said, to provide the great army of industry with sergeants, *i.e.*, with managers and foremen of works, the results have so far surpassed expectation that in many instances the sergeant has become the commissioned officer, and the manager has developed into the engineer. The system which assigns to each of these institutions a certain number of departments as its special domain gives them an all-embracing, as well as uniform, influence. As the principal training grounds of mechanical skill, more especially in metallurgy, they are, undoubtedly, of first rate importance to the country. They possess the initial advantage of a high standard of admission, permanently secured by a difficult competitive examination. The students are thus from the outset picked candidates, and not only have they an entrance examination to pass, but the teachers of theory, the engineers, the managers of workshops, are themselves selected by a competition of which the conditions are determined by the Ministry of Commerce. The Director of the school holds his appointment directly from the same Minister. Only those students who pass through the entire course of three years receive a diploma, which is subject to an examination, and which confers the title of "Élève breveté des Écoles Nationales d'Arts et Métiers." No student who is without this diploma has any title to call himself a pupil of the school. A special diploma is reserved for those who pass the final examination with distinction. The schools themselves are under the jurisdiction of the Minister of Commerce, and under the immediate supervision of the Prefect of the Department in which they are situated. They are subject to annual inspection by a Government Inspector, who reports on their condition to the Minister. In spite of their obvious defects, which arise mainly from false views of moral and physical training, their popularity is very great. For the 300 places, in round numbers, which they offer for competition each year there are no less than between 1,200 and 1,300 candidates. They have all the prestige of Government institutions by which a French parent lays so much store. An even more potent source of attraction is the prospect which they hold out to all fairly industrious and well-conducted students, of escaping two years of military service. Such dispensation is granted by law to four-fifths of the number of students who at the leaving examination succeed in obtaining 65 per cent. of the possible total of marks. In 1895 the successful candidates at Châlons numbered 51, at Angers 54, at Aix 56.

Though admission to the schools is nominally subject to an annual fee of 24*l.*, the scholarships granted by the State, the Department, or the Commune render the education of two-thirds of the students partly or wholly free. The entire cost of a pupil is at the present time about 64*l.* a year. The annual expenses of the school at Châlons amounts to about 17,000*l.*, showing a slight decrease in comparison with former years, due to recent retrenchments.

CHÂLONS.

The English Technical Instruction Commission of 1881, which devoted a good deal of attention to the school at Châlons, expressed the view that there were two respects in which the system of instruction pursued there laid itself open to criticism, *viz.*, the artificial over-elaboration of the work, and the fact that the importance of the element of time in the question of production was not sufficiently considered. It is satisfactory to know that the truth of both these criticisms is fully admitted by the present Director, whose appointment is comparatively recent, and who may therefore be regarded as viewing the matter in an impartial light. He considers that his efforts to guard against these defects have been, in great measure, successful. This is more especially the case with regard to the preparation of dimensioned sketches, rapidity in the execution of which has been encouraged by a new system of awarding marks. In the practical work itself the difficulty of effecting a change has proved greater, but the importance of observing greater strictness in the economy of time and in the avoidance of artificial finish, a defect which is admittedly still to be found, is fully recognised. The Director emphasized his desire to give as much development as possible to the practical, as opposed to the theoretical, side of the work. In his opinion the general training of the school produces

much better results than that of the École Centrale at Paris, which is too exclusively scientific. The theoretical training at Châlons, though inferior to that of the Paris school, is superior to that given at Cluny, a comparatively new and lower grade school, where, on the other hand, as much as seven hours a day are spent in workshop practice, as against six at Châlons. It may be added that, in the opinion of the same informant, the general level of technical knowledge has been decidedly raised throughout France during the last 12 years. This is due principally to the better preparation provided by the Écoles Pratiques d'Industrie and the Écoles Professionnelles for the Écoles d'Arts et Métiers, at which the standard of the entrance examination, especially in geometry and algebra, has been considerably increased in recent years.

The English Commission of 1881 were struck by the severity of the system enforced at Châlons. This discipline, which is common to all the three schools, is strictly military as regards dress and routine, and is more than military in the minuteness of the regulations which govern every waking moment of the day, and impose penalties on almost every conceivable offence. A school may well be thought severe whose pupils rise, go to rest and bathe, to beat of drum, where all "dangerous games," all newspapers, political and illustrated, are forbidden, and where the only form of distraction provided, from one week's end to the other, is a compulsory walk on Sundays, under strict supervision. A former pupil of the school at Aix, and subsequently head of a technical school at Cairo, discussing in 1887 the criticisms of the Royal Commission says:—"Quant au manque d'amusements et au caractère très rigoureux de la discipline, il n'y a malheureusement rien que de très exact dans l'appréciation de la Commission Anglaise. Pour ma part, je ne pense pas qu'on puisse être guère plus maltraité dans une maison de correction, qu'on l'était de mon temps à l'École d'Arts et Métiers d'Aix. Il est surprenant que l'administration supérieure n'ait pas encore reconnu que les désordres périodiques, invariablement suivis de renvois en masse, ne sont que la conséquence d'une compression et de tracasseries que rien ne saurait justifier. Ce ne sont pas des gendarmes qu'il conviendrait de donner aux élèves comme surveillants, mais des maîtres instruits et bien recrutés, possédant l'éducation, le tact et la patience nécessaires pour remplir des fonctions aussi délicates."

My own visit to Châlons was made under circumstances which must have rendered the presence of a stranger embarrassing even to French courtesy. On the previous day the school had been the scene of a serious mutiny. Traces of the popular excitement which it had aroused were still evident. The school buildings were in occupation of military police and a company of regular soldiers. The entrance gate was barred by sentries. I was, consequently, requested to defer my coming till the afternoon, by which time the whole body of 300 students had been expelled, and marched to the railway station under military escort. On my return the busy life of the school had been replaced by silent corridors and empty workshops. This did not, however, prevent my receiving a most courteous reception from the Director and other officials, who enabled me to see every part of the school, and obtain all requisite information. The outbreak, it appears, originated with the 100 students of the first year, who had refused to enter their class rooms, and had insulted their teachers. The sentence of expulsion from the school, which these acts of insubordination entailed, had the immediate effect of inciting the remaining 200 students to make common cause with their fellow pupils. Having wreaked their displeasure on the furniture of the establishment, the united 300 poured out into the streets and marched to the prefecture, where, with loud shouts, they demanded the instant dismissal of the Director. Followed by a considerable proportion of the populace, they then proceeded to parade the town for several hours. They finally returned to a late supper at the school, and on the following morning were, as already stated, sent back to their homes. In the opinion of the Director himself, the incident was in great measure due to the evil influence of the day students, an element which was first introduced into the school a few years ago, but which has recently been suppressed. It can easily be imagined that the amusements of a garrison town to which, in the absence of healthy outlets, these members of the school would devote their greater liberty would not be conducive to discipline. From

another source I learnt that the disturbances were due to the abolition of certain privileges, with regard to leave of absence, hitherto enjoyed by the day students. It may be mentioned that amongst the townspeople, whose standard of hardship are the woes of the military recruit, there appears to be little sympathy for the grievances of the students.

In 1891 a new department, the Section Normale, was opened at Châlons. It is intended to train teachers, who already possess the certificate for teaching in higher grade schools, as Technical Instructors for the *Écoles Pratiques d'Industrie* and the *Écoles Professionnelles*. The students of this section follow nearly the same course of instruction as the other, but with less completeness, for they remain only two years. They do not live in the school itself, but at the Training College for Schoolmasters in the town, and they wear no uniform. They all hold Government scholarships. The institution of this department has not proved a success. Between the years 1891 and 1896 the total number of candidates has not exceeded 26. The Director considers that the training of technical school teachers is rather out of place at Châlons, and would be more conveniently carried on at Cluny.

In 1895, the school at Châlons met with great losses through a fire which entirely destroyed the fitting shop and a large part of the machinery. Much of the latter has, therefore, had to be renovated, or entirely replaced, at a cost of 8,000*l*. Owing to the work of repair, it has not been possible to undertake any orders from without, except in the foundry, where they amount to the annual value of 400*l*. to 600*l*. The present new fitting shop has a cubic space twice as great as that of the old one, and in superficial area, it is larger by one-third. All the workshops are lighted by electric light and heated by steam.

It has of late years become increasingly difficult for apprentices on leaving the school to find situations as foremen of works. The director always advises the students to spend one or two years in a workshop before they fulfil their term of military service. According to the regulations of the school, boys who enter must be at least 15 and not over 17 on the 1st of October of the current year. They leave, therefore, at 18 or 19, and have one or two years before they need enter the ranks. The number of those who annually pass out of the school is about 90. Of these about 50 to 55 do only one year's service, in accordance with the military law of 1889 already referred to.

As a means of arriving at a practical estimate of the part which the three important engineering schools of Châlons, Angers, and Aix play at the present time in the industrial life of France, I have endeavoured to examine into the nature, as well as the actual amount of the employment which is open to students at the end of their training. As a basis of this investigation I have, by special permission, made use of the last annual Report of the *Société des Anciens Elèves des Écoles Nationales d'Arts et Métiers*. This influential association, which was founded in 1846, and whose handsome new premises in the rue Chauchat were opened by President Félix Faure in February 1895, is joined by more than half of all the students who annually leave the three schools. The figures given below apply only to this larger half, which may, however, be considered as more than representative of the practical outcome, under the most favourable conditions, of the institutions in question. Membership of a society, to which so many distinguished former pupils of the schools belong, is in itself a guarantee of professional standing and *bona fides*. It may, on the other hand, be taken for granted that, in the information which members supply, as to their present position, they are under no inducement to depreciate its actual status. The case is, perhaps, rather the reverse. It is, in some cases, difficult to determine the exact nature of an appointment where a term such as that of engineer, may be used somewhat indefinitely. The title *Chef*, as in *Chef de Travaux*, *Chef d'Atelier*, and *Chef de Filature*, I have translated manager. On the other hand, the numerous lesser designations, such as *Sous-chef d'Atelier*, *Chef de Matériel*, *Chef d'entretien*, *Chef de fabrication*, *Chef d'exploitation*, *Conducteur des travaux*, *Vérificateur de travaux*, &c., as well as that of *Contre-maître*, have been included under the head of 'Foreman.' The statistics which, after careful examination into each individual entry, I have drawn up, refer to students who entered the schools in the years 1887-1893, and who, therefore, allowing for a three years' course, quitted them within the years 1890-1896. With regard to the figures them-

selves, the two items which evidently call for most attention are those under the heads "Without specified position" and "Without any specified occupation." Together they constitute '32 of the total number of students. In view of the fact that the general tendency would, if anything, be rather to exaggerate than to under-estimate professional standing, it is, no doubt, justifiable to assume that where no employment is mentioned in the club register, it does not exist. Moreover, the use of the indefinite title of dessinateur or draughtsman, without reference to any particular place of business or department of trade, fairly leads to the conclusion that employment, if it exists at all, is of an uncertain and irregular character. The deduction to be made, for instances, where a student, on the completion of his training is independent of a calling, or does not desire it to be known, is of little account. The general impression produced by the figures will, no doubt, be that, while the outlets which are open to the pupils of these schools are both substantial and varied, embracing, as they do, all the principal departments of industrial life, the present demand for the better positions, such as that of manager or foreman, or indeed for any positions, very much exceeds the supply.

By far the most important numerically are the draughtsmen, who, in the aggregate, number no less than 260 out of 866, or about three-tenths of the whole. The engineers and sub-engineers number 42, the managers and sub-managers 25, the foremen and sub-foremen 41. It will be noticed that a comparatively insignificant number of students appear to obtain work abroad on the conclusion of their training. Of employes, including workmen, with definite occupations, there are 72, or about one-twelfth of the whole.

Of great importance from a national point of view is the element of marine engineers. In the rigorous training peculiar to these schools they must receive an exceptionally thorough preparation for the duties of their calling. They are responsible, as the annexed list of ships shows, for the safety of some of the principal vessels in the Fleet. M. Faure, on the occasion alluded to above, specially referred to the valuable services which they render to the French Navy.

ANALYSIS of the POSITIONS OCCUPIED at the PRESENT TIME by 866 former PUPILS at CHÂLONS, ANGERS, and AIX, who entered these COLLEGES during the Six Years 1887-1893.

Land Forces.

	Total
Artillery :	
Quartermaster, sub-lieutenant, corporal, gunners, (3) draughtsman (artillery commission)	7
Engineers :	
Sergeant-major, sappers and miners (5), secretary to engineering staff, Châlons	7
Artificers	1
Infantry :	
Sergeant, privates (44)	45

Sea Forces.

Marine Engineers :	
First engineers (8), quartermaster engineers (4), second engineers (33), apprentice engineers (12)	57
Vessels in which above Engineers are serving :	
Algésiras (3), Amiral Charner (3), Amiral Baudin (3), Amiral Duperré (2), Avalanche, Aventurier. Brennus (5), Bugeaud, Carnot, Casabianca (torpedo destroyer), Descartes, Devastation (7), Dubourdieu, Eure, Faucon, Forbin (3), Formidable, Fulton, Hoche, Iberville, Jauréguiberry (2), Laclocherie, Le Bruix, Magenta (5), Marceau, Neptune (2), Pascal, Redoutable, Rigaut de Genouilly, Suchet, Vautour, Zouave	
Naval construction :	
Designer, draughtsmen (2)	3

	Total
Shipping companies:	
Draughtsmen (2), employé -	3
War material:	
Draughtsmen (2) -	2
Ponts et Chaussées:	
Road foremen (2), draughtsman, employés (2) -	5
Government workshops:	
Fitter -	1
Public works in Colonies:	
Foreman -	1
Railways:	
Manager, sub-manager, inspectors (2), foremen (8), fitters, carpenters, model-makers, founders (25), employés (7), designing office (4), mechanics (7), engine driver, stokers (6), draughtsmen (16) -	78
Omnibus companies:	
Manager, sub-manager, inspector -	3
Mechanical construction in general:	
Contractor, foremen (4), fitter, draughtsmen (29), employés (10) -	45
Instrument making:	
Engineer, draughtsman, employé -	3
Boiler-making:	
Second foreman, draughtsmen (5) -	6
Steam engines:	
Manager, inspectors (3), draughtsmen (3) -	7
Machine tools, agricultural machines:	
Wire-making apparatus, printing machines, meters, pumps and engines (Cail), electric, gas, petroleum, and general motors, &c. Maker, managers (2), engineers (3), fitter, designing office (2), draughtsmen (14), employés (3) -	26
Metallurgical construction:	
Bridge-making (Fives-Lille), cranes and hoisting gear, &c. Engineers (2), foreman, fitters (2), designing office (4), draughtsmen (23), employé -	33
Building construction:	
Heating and sanitary apparatus, lighting and ventilation, roofing, chimneys, carpentry, hardware, lock-smithing. Contractors (3), managers (3), engineers (2), agent, director of works, draughtsman, employés (3) -	14
Metallurgy:	
Foundries, iron works, rolling, blast and steel works, model-making, cables, tubing, &c. Constructor, managers (3), sub-manager, sub-inspector, engineers (11), foremen (12), fitter, electrician, model-makers (2), designer, draughtsmen (40), employés (16) -	90
Mining and boring:	
Managers (2), mechanical engineer, surveyor, smelter, chief designer, draughtsmen (8), employés (4) -	18
Waterworks, water supply, filtering, drainage, &c.:	
Manager, engineer, agent, foreman, draughtsmen (3), employé -	8
Gasworks:	
Engineers and sub-engineers (6), inspector, foreman, draughtsmen (2), employés (2) -	12
Electricity, electrical, and telephone fittings:	
Engineers (7), draughtsmen (6), employés (4) -	17
Chemical industries:	
Breweries, wine, distilleries, lubricants, polishing substances, oil, petroleum, chemical products, sugar refineries, explosives, &c. managers (3), engineers (4), foremen (2), agent, employés (3) -	13
Pottery, bricks, tiles, glass, cement, lime:	
Managers (2), engineers (3), draughtsman, employés (3) -	9
Textile industries:	
Wool spinning, combing and weaving, rope manufacture, mechanical construction, manager, foremen (2), mechanic, employés (4) -	8

	Total
Paper works :	
Manager, engineer, foremen (2), draughtsmen (2) -	6
Various trades :	
Wire, silk, satins, jewellery, ironmongery, carpentry, indiarubber, carriages, tools, hats, sticks, &c. Makers (6), manager, foremen (4), employés (4) -	15
Miscellaneous employments :	
Hotel employés (2), draughtsmen (3), restaurant employé -	6
Employed in works and firms of unspecified nature :	
Engineers, foremen, agents, fitters, employés, &c. -	27
Without specified position :	
Draughtsmen (95), contractors (2), engineers (7), fitters (10), marine engineers (11), electricians (5), carpenter, mechanical constructor, founder, chimney constructor, machinist, model maker, engraver -	137
Without any specified occupation -	139
Technical instruction :	
Principal of Technical School, St. Quentin; manager of Technical School, Jerusalem; teacher at Trade School, Saumur; teacher of mathematics and industrial drawing. Schools of marine engineering: Toulon, 1st engineer; Brest, 1st engineer, 2nd engineer. Manager of workshops, Angers; foreman at École Pratique, St. Chamond; second foreman at École Nationale de Cluny. Students: School of Electricity (2), Electrotechnic Institution (Liège); École Centrale (Rives) -	14
Total -	866

Positions (included in above) in foreign countries and French colonies:—

Australia, Coolgardie: civil engineer.
 Cochin China: foreman, public works.
 Constantinople: manager, waterworks.
 Belgium: draughtsman, mechanical construction (3), waterworks (2), steel works.
 Egypt, Nag Hamadi: engineer, sugar refinery.
 Ivory Coast: agent.
 Guiana; employé, Ponts et Chaussées.
 Italy: foreman, gas company.
 Mexico: draughtsman, electrical engineer.
 Russia: engineer, steel works (3), manager, explosives and chemical products; employé, mines. Salonica, foreman of workshops.

As to the position occupied by the Écoles d'Arts et Métiers at the present day, it may be said that they have to a great extent deviated from the original purpose for which they were founded. That purpose was to form workmen, whose theoretical training would, in many cases, eventually fit them to become foremen or even managers, but whose scientific outfit could not under any circumstances give promise of a higher career. At the present day, a student of one or these schools, who has met with any success, no longer desires to be regarded, according to the current phrase, as a "Sous-officier de l'industrie française," but as an "Engineer," who has issued from a school, which, though it cannot aspire to the high mathematical standard of the École Centrale at Paris, more than compensates for this fact by the unrivalled practical training which it affords. In this sense, therefore, and accepting them at their own, perhaps exaggerated, valuation, the Écoles d'Arts et Métiers are to be considered as belonging no longer to Secondary, but to Higher technical education. In proportion as their standard has been raised, they have become more and more out of touch with the average École Professionnelle, whose resources are now generally condemned as inadequate even for the more moderate demands of modern technical knowledge. Preparation for the Écoles d'Arts et Métiers has, consequently, in large measure, been restricted to certain schools who have made this their speciality. This state of things will, no doubt, be greatly improved by the development of the Écoles Pratiques d'Industrie,

which represents the technically regenerated École Professionnelle. But, however good the training in these schools may be, it is professedly more practical than scientific. They are to be the first, and, as a rule, the only training ground of the workman proper. There must, moreover, in the nature of things, always remain a large number of boys who, while fitted to become excellent practical workmen, altogether lack the mathematical ability requisite for gaining admission to the Écoles d'Arts et Métiers. It was therefore to be expected that a real need should make itself felt of some place of strictly intermediate education to take up the rôle which the Écoles d'Arts et Métiers have to a great extent abandoned. It was to meet this want that the new Government school at Cluny was created, an institution which may be best described as the Châlons of 25 years ago.

CLUNY.

(École Nationale Pratique d'Ouvriers et de Contremaîtres).

The ancient and celebrated Abbey of Cluny has, since 1891, been the home of an important technical school, whose special aim is to train workmen in such a manner as to fit them subsequently to become foremen in the various trades connected with metal and wood work. The actual site of the school is considerably larger than that of any of the Écoles d'Arts et Métiers, as it extends over no less than 22 acres, about seven acres of which are occupied by the buildings themselves. For many years the same premises were tenanted by a secondary training college for teachers, which was suppressed when, in 1891, the modern side of French secondary education underwent a complete re-organisation. The general arrangements of the school are the same as those at the Écoles d'Arts et Métiers. Like these it is a State school under the Ministry of Commerce, with a three years' course. Diplomas are awarded after examination at the end of the third year, but do not, as in the case of the Écoles d'Arts et Métiers, qualify, without further examination, for the position of apprentice engineer in the fleet. The cost of training is rather lower than at the schools referred to, the annual budget amounting to about 12,000*l*. The school fees are 20*l*. per annum, but, in the great majority of cases, they are covered wholly or in part by bursaries. In 1895, out of 100 candidates admitted, 54 were altogether exempt, 18 paid one quarter, and 20 one half the amount of the fee. Every student is, however, expected to deposit four guineas for general expenses, and this charge is in every case exacted.

The entrance examination includes writing, spelling, arithmetic (the first four rules, fractions, decimals, proportion, square root) and the elements of geometry (including plane surfaces). There is also a practical test in carpentering, fitting, forging, or founding. The selection amongst these subjects is left to the candidate, and determine the particular workshop in which, after his admission to the school, he spends the entire course of three years. Three-fifths of the maximum number of marks, with a fixed minimum in each subject, qualify for admission. Of those who qualify, the first 100 are definitely admitted. In addition to the resident pupils there have hitherto been a small number of day boarders, but, as at Châlons, this element has now been condemned and suppressed. The annual number of candidates for admission to the school number about 340 to 350.

The apprentices are occupied for 12 hours a day, the routine being as follows: Rise at 5.30 a.m.; 6-7, preparation; 7-7.30, breakfast; 7.30-9, drawing lesson; there follow seven hours workshop practice; from 5.30-7, a lesson in mathematics, physics, chemistry or French. After supper an hour's preparation. A walk on Sunday, on which day there is also preparation work for three or four hours. It will be evident from this recital that the severity of the routine is equal to that of the École d'Arts et Métiers.

The theoretical instruction, which is directly practical in its tendency, includes arithmetic, projections and a general knowledge of logarithms.—Elementary geometry, general notions as to the ellipse, hyperbola, parabola, circle, cycloid and epicycloid.—Algebra, up to quadratic equations, exclusive.—Plane trigonometry, very elementary.—Descriptive geometry, up to and including the intersection of bodies; the screw and conical spiral, screw with square and triangular threads.—Laws of motion change of motion in machines,

kinematics of machines.—Industrial mechanics, elementary notions, descriptions of the chief parts of machines and of the machines and apparatus used in the wood and iron industries, detailed and full description of steam engines and hydraulic motors with formulæ of work. Elementary knowledge of the resistance of materials; physics and chemistry, elementary knowledge; industrial drawing, writing and book-keeping, grammar, history of France and geography of France and her colonies, hygiene. The staff of teachers includes one for mathematics, one for mechanics, two for drawing, and one for French.

The practical instruction comprises carpentry and model-making, forging, founding, lock-smithing, boiler-making, and fitting and mounting, in six separate departments, of which the three first have each about 30 apprentices, 10 of each year. In the fourth department, still in formation, there will be 15; in the fifth, which is likewise new, 15; while the sixth has nearly 200 apprentices, who are arranged, according to age, into three divisions. There are special sections for machinery and instrument-making, which are formed by these three divisions in turn. It is ultimately intended to confine the instrument-making principally to electrical apparatus, but at present the requisite funds are not available.

Over each of these departments there is a sub-manager, except where, for economical reasons, the position is held by a master-workman. The sub-managers receive a salary of 96*l.*, 108*l.*, or 120*l.*, according to their grade. The technical staff includes besides the director, who is at the same time engineer-in-chief, one chief manager, nine sub-managers, and 12 workmen, five of whom are ouvriers instructeurs or workmen instructors. The official regulation which provides that all sub-managers shall be selected by competitive examination is in practice overlooked. They are engaged on the strength of testimonials, and provisionally. For the post of chief manager, however, and for that of all teachers on the staff, there is a special examination which is held at the Conservatoire des Arts et Métiers at Paris.

The chief engineer exercises a general supervision over all the work, both practical and scientific. All drawings are designed by him or one of the managers, and are then executed under the supervision of one of the teachers of drawing.

The carpentry and model-making shop measures 35 by 15 mètres. It is a low vaulted room, used in the former days of the abbey for storing flour. It has the disadvantage of being at a greater distance from the foundry than is desirable, or than is usual in trade establishments. The dimensions of the fitting shop are about 60 by 20 mètres, the accommodation being barely sufficient. The foundry, which measures 30 mètres by 20, is also rather too crowded. It contains 30 furnaces; six more are in construction. The boiler-making, which is at present included in this department, is to be placed in a separate workshop, as the noise which it occasions is found to be a serious annoyance to the founders.

Every piece of work is first modelled in the carpentry and model-making shop. Having passed through the foundry it is sent to the fitting room, where, in order to avoid the specialisation of the ordinary workshop, it is mounted and fitted by the same apprentices. The outside orders executed at Cluny are insignificant in amount. Since the foundation of the school, the apprentices have been almost exclusively occupied in supplying their own requirements. With the exception of a few larger engines with which the school was started, all the machines in use have been constructed under the supervision of the chief engineer and his subordinates. This fact in itself says a great deal for the really practical nature of the instruction. The apprentices have recently been engaged in the construction of two turbines for the supply of electric light; as samples of their work, two drilling machines, (a stamp-hammer *marteau pilon*) of 1,200 kilogrammes, two filing machine vices, and a steam engine may also be mentioned. They have, moreover, been employed on repairs and alterations in the building itself.

With regard to the criticisms passed by the English Commission of 1881, on the over-elaboration and want of quickness in the work at Châlons, the chief manager admitted that the same remark would no doubt apply to Cluny. These features, however, he considers to be almost inevitable, if the primary object of securing careful and accurate work is to be kept in view. Under

pressure, the requisite quickness would, he thinks, be acquired later on. As to the prospects open to pupils at the close of their training, some difficulty is, it appears, found at Cluny, as at other schools, in finding places for them. The difficulty is, however, much lessened, if they are willing to become workmen. Many apprentices on leaving the school try to find occupation in drawing offices, because the work is both easier and more lucrative. Of the great numbers who look for such employment an idea may be formed from the statistics already given in connection with the school at Châlons. So far as Cluny is concerned, the chief manager considers that those who take this course really stultify the main purpose of their training. They are no longer workmen, but draughtsmen. At the school itself, too, pupils are disposed to neglect their workshop practice in order to spend as much time as possible on drawing, which they consider will be more useful and profitable to them. The disproportionate attention given to drawing is, it appears, to some extent due to the fact that, in view of the insufficient number of regular teachers of drawing, apprentices themselves are often employed in executing the details of rough sketches.

The foundation of Cluny has been too recent to admit of any exact estimate as to the future success of the school, or the place which it will eventually occupy in the technical hierarchy. Its local position, though it has, in one sense, many natural advantages, is not altogether favourable to the prosperity of the school. The great works at Creuzot, though comparatively so near, are rendered almost inaccessible by bad railway communication. The little town itself has no industries to speak of, and is, from a strictly modern point of view, *un trou*. With regard to the character of the instruction, I am informed that, even at Cluny, a certain tendency to give prominence to the theoretical at the expense of the practical side of the training is becoming visible. This is no doubt the tendency of all technical colleges, in other countries no less than in France. Wherever an organised system of teaching exists, the academic element is, perhaps, naturally inclined to encroach on more practical interests.

At the present time one of the chief uses of the school at Cluny is to receive the great overflow of candidates who do not succeed in gaining admission into the Écoles d'Arts et Métiers. Besides the 700 or 800 who fail altogether, there are every year about 200 who, though they have qualified for admission by obtaining three-fifths of the examination marks, are not included amongst the successful first 100. For both these categories Cluny offers another chance. The Entrance examination is purposely deferred till October, after the publication of the list of successful candidates at the Écoles d'Arts et Métiers. A third class to whom Cluny is open are a limited number of those members of the Écoles d'Arts et Métiers who have failed to pass the Intermediate examinations at the end of their first or second year, and who are allowed to migrate to Cluny.

3. SUMMARY.

French views on Technical Education may be said to demand attention chiefly in so far as they bear on the organisation of Primary Technical Schools. If in Secondary and Higher Technical Instruction we admit the authority of German methods, we may well look to France for some light on a subject to which the State, in conjunction with the best authorities of the country, has devoted close attention for more than 20 years. It cannot, at any rate, be doubted that in French experience we may find ample illustration, if not in every case an adequate solution, of questions which in our country are still subject to discussion and tentative experiment. With a view to securing greater clearness in a matter of some intricacy it may be well to review shortly the general development of the French system, with its main results, and then to examine one or two of the more important characteristics in which that

system presents a contrast to English methods. The movement in favour of Primary Technical Instruction was, as we have seen, originally due to a perception of the fact that a marked decline had taken place in the technical skill of the country. For this deterioration two main causes were assigned. It was recognised, on the one hand, that the old system of Apprenticeship, *i.e.*, a system under which an apprentice received a definite and prolonged training at the hands of a master in the trade, had practically ceased to exist, and that modern industry was tending more and more to regard each individual worker as a tool which should possess just sufficient intelligence, and no more, to do the restricted task required of it. It was, on the other hand, no less evident that the complexity of modern trade processes had increased to such an extent as would render the old system of apprenticeship, were it still in operation, quite inadequate for the necessary work of instruction. For this condition of things the State undertook to find a remedy, wisely recognising that it was hopeless to expect from trade itself a regeneration of trade methods, and that for this purpose an impulse was required which could only proceed from a central authority. By the law of December 1880, Primary Technical Instruction was for the first time placed on a definite basis. As a nucleus of the new organisation the Apprenticeship School, such as already existed under Municipal management in different parts of the country, was adopted, and was now incorporated into the public system of Primary Instruction under the name of *École Manuelle d'Apprentissage*. To this type of school, a number of other schools, styled, in virtue of the modicum of Technical Instruction which they provided, *Professionnelles*, were to be "assimilated." It is the progress of this assimilation, to use the expression in a more literal sense, which may be said to constitute the history of Primary Technical Instruction in France during the last 18 years. The gradual approximation of a less practical to a more practical type of school is but the logical outcome of a policy which, recognising that old methods of trade instruction are extinct, has deliberately resolved to create, in their place, a new and living bond between the apprentice and the trade workshop, a bond which, slender at first, has been continually growing in strength. The development which has taken place in the interval between the legislation of 1880 and the establishment of the *Écoles Pratiques de Commerce ou d'Industrie* in 1893 appears most clearly in the gradual transition from "*Travaux Manuels*" to "*Ateliers*," from mere Manual Instruction, limited in amount and indefinite in aim, to definite workshop instruction. The peculiar title of *Écoles Manuelles d'Apprentissage*, which was given to the type of school contemplated by the Bill of 1880, appears, as already observed, to indicate a system intermediate between Manual Instruction on the one hand and trade teaching on the other. Uncertainty as to the precise nature and method of the instruction to be given was further increased by the fact that for eight years after the original Bill no uniform standard of efficiency existed, each school drawing up its own programme subject to ministerial supervision of a more or less nominal nature. It was not till the establishment, in 1886 and 1887, of the *Écoles Nationales Professionnelles* at Voiron, Vierzon, and Armentières, that a definite step was taken by the two Ministries towards the realisation of their declared policy of approximating educational methods to the requirements of Trade, the *École Manuelle d'Apprentissage* to which the *École Professionnelle* was to have been assimilated, having, as we have seen, never come into existence at all as an official type of school. In each of the *Écoles Nationales*, with their three divisions, we see a general education culminating in an industrial one, Manual Instruction in the Elementary School being followed by systematic workshop training in the Higher Grade School. By the provision which they afford for special trades in different districts these establishments are intended more

particularly to represent the principle of variety and adaptability in Technical Instruction. In 1888 a definite standard, applicable equally to an *École Manuelle d'Apprentissage* and an *École Professionnelle*, was laid down by the issue of an official syllabus which is specially noteworthy as being the first detailed scheme proposed by the two Ministries as the basis of a national system of Primary Technical Education.

Though with the foundation of the *Écoles Nationales* and the issue of a syllabus the limit of the concerted action of the two departments has been reached, and the next step is taken by the Ministry of Commerce on its own responsibility, the legislation of 1892 is no more than the natural development of a movement of which the principal aim had from the very first been the approximation of the school to the workshop. It was the inevitable recognition of the continued failure of the average *École Primaire Supérieure Professionnelle*, as distinguished from the *Écoles Nationales* and a few other good schools, to satisfy the industrial requirements of the country. In a special degree, however, the institution of the *Écoles Pratiques* was intended to remedy the existing scarcity of workmen in the mechanical trades which was recognised as constituting a serious danger to the general prosperity. In the words of the official programme "*L'atelier ne forme plus d'apprentis : d'où pénurie inquiétante d'ouvriers pour l'avenir, car cet état de choses, si l'on n'y remédait à temps, conduirait insensiblement l'industrie nationale à sa décadence.*" The greater sense of freedom now felt by the Department of commerce in its new capacity as an independent authority, with financial resources at its disposal, is reflected in the syllabus of 1893 as compared with that of 1888. The practical work no longer figures as "*Travaux Manuels,*" but as "*Ateliers,*" and occupies 30-33 hours a week as against 16-27. The weekly total of hours, which was fixed at about 40-50 for an *École Manuelle d'Apprentissage*, or an *École Professionnelle*, is now raised to 55-60. The time devoted to general instruction shows a reduction as compared with that laid down for an industrial school in 1888. The feature, however, which must be regarded as of most importance in the scheme of 1893 is the clear distinction drawn between the aims and methods of an *École Pratique d'Industrie* as compared with those of an ordinary *École Professionnelle*. The latter schools, in which only "*une part est faite à l'enseignement professionnel,*" "*ont simplement pour objet la préparation à l'apprentissage.*" The new type of school, on the other hand, aims at forming clerks and workmen capable of being "*immédiatement utilisés au comptoir et à l'atelier.*" It is intended to turn out apprentices who, besides possessing a sufficient stock of technical knowledge are "*rompus à la pratique de l'atelier.*" To ensure this, and to prevent the apprentices, on entering the trade shop from being "*trop inférieurs*" to the actual workmen, the official syllabus declares it to be essential that workshop practice should play a large part in the curriculum of the school. It is in conformity with this principle that at the *École Pratique* of St. Étienne, the apprentices of the third year work spend, during the two last months of the year, as much as seven hours a day in the workshop "*dans le but de les habituer à supporter le poids d'une petite journée de travail, de rendre moins brusque la transition entre l'école et l'atelier; dans le but aussi de leur montrer ce qu'ils peuvent produire et gagner et de les exciter ainsi à travailler avec plus d'ardeur.*" A further indication of the essentially practical character of the new schools appears in the recommendations which the official programme makes with regard to metal and wood work. The scheme of instruction in the latter subject is not to contain anything calculated "*to make a mere amusement*" of the work. Certain exercises which are prescribed in some methods and which consist in "*the execution of small models and little articles on a reduced scale, with a view to giving the hand*"

"a certain dexterity, although the pupil is as yet ignorant of the proper way 'to handle the tool which he is using," are condemned as quite unsuited to form the basis of serious apprenticeship. The view here expressed is noteworthy not only as establishing an essential distinction between some of the generally accepted methods of manual instruction, as opposed to those of the trade shop, but as contesting the utility of the one as a preparation for the other.

It should be noticed that though it is in the Écoles Pratiques that we see the system of apprenticeship carried out in its fullest extent, the principle underlying the system is not confined to these schools, but is practically inherent in every form of technical instruction in France which is in any way preparatory to trade apprenticeship. The distinction between preparation at a school for trade apprenticeship, and actual school apprenticeship preparatory to trade apprenticeship which the official Circular of 1893 declares to be an essential one, is in reality one of degree, not of principle. No sharp line of division can be drawn between the two systems. Thus at Vierzon, which, as one of the Écoles Nationales Professionnelles, was intended to be merely "préparatoire à l'apprentissage," the school syllabus describes the first two years of the course as embracing "Culture générale et commencement de l'apprentissage général," while in the third year the "normal section" provides "préparation à la vie industrielle par des études pratiques et des travaux d'apprentissage." The claim made, with some exaggeration, by M. Buisson, as Director of Primary Instruction, on behalf of the three National Schools, that their curriculum "leads a youth up to the threshold of the factory or the Engineering School, and enables him to become a finished workman after a few months' practice," is not less, but greater, than that advanced even in the case of an École Pratique. The practical unanimity of opinion existing at the present time in France with regard to the approximation of the school to the workshop appears further in the view expressed in the report of the Administrative Commission of the École Martinière at Lyons: "Ce qu'il faut aujourd'hui au commerçant ou à l'industriel, ce ne sont plus seulement des jeunes gens ayant reçu une instruction générale, alors même que cette instruction générale aurait une couleur professionnelle plus ou moins prononcée. Ce sont des jeunes gens qu'ils puissent utiliser immédiatement ou le plus tôt possible, parce qu'ils leur apporteront une instruction technique et spécialement appropriée à la profession qu'ils veulent exercer."

The close resemblance which this language, defining in 1895 the future aim of the Martinière, bears to the "aptes à être immédiatement utilisés au comptoir et à l'atelier" of the Écoles Pratiques, is all the more striking from the fact that the Martinière Commission expressly rejected the idea of converting their school into an École Pratique. With this attitude, in which a desire to enter into immediate relations with trade is openly avowed, we may contrast the comparatively neutral position of a school like the École Professionnelle at Rouen, of which the aim is expressed in the words, "Par son enseignement solide, pratique, étendu et professionnel, l'École permet l'accès des professions les plus diverses, en particulier, des carrières commerciales et industrielles; les élèves qui en sortent sont à même de s'assimiler vite et bien la profession choisie." But even in a school of this type, where only eight to ten hours a week are devoted to workshop practice, the principle of trade apprenticeship is virtually inherent, though not directly admitted. The actual degree of school apprenticeship is practically determined by the nature of the particular trade in view and the proximity of the workshop, this proximity being naturally greater where primary is not followed by secondary technical education than where this is the case. The prevalence of a system of apprenticeship both in primary and secondary instruction renders it more

and more incumbent on all schools, with any pretensions to efficiency, not only to recognise the important principle of concurrent theory and practice, but to keep the character of the work itself in touch with the principles and methods of the trade workshop. Even for those boys who, in the comparative ease of a municipal École Professionnelle, like that at Rouen, escape for a time the hardships of the strictest form of apprenticeship, the road to future employment lies, in a large number of cases, through the rigorous workshop training of one of the Écoles d'Arts et Métiers, or of the school at Cluny. It may be regarded as one of the most important results of the efforts made to approximate the school to the workshop that it has drawn much closer than before the bonds existing between primary and secondary technical instruction.

With the doctrine of "immediate utilisation" the approximation of the school to the workshop may be said to have reached its completion and French Primary Technical Education its climax. It would, however, be a mistake to suppose that this principle carries with it that of actual supersession of trade apprenticeship itself. Such an intention the official syllabus expressly disavows. "It is not to be expected that an apprentice, on entering a trade shop, should at once reap the advantages of the technical training which he has received at school, or that he should receive the same wages as a workman already inured to the toil of a regular day's work. It must be remembered that the practical value of an artisan consists not only in the knowledge of his craft, but in the amount of work which he produces. At a school an apprentice acquires a theoretical and practical knowledge of his trade, but only a trade shop can teach him to produce. He enters the trade shop as a *petit ouvrier* to finish the second stage of his apprenticeship. Though many trade processes will be new to him the principle underlying them will be familiar, and, as his experience grows, he will, in virtue of his technical knowledge, infallibly outstrip those fellow apprentices who have not had the advantages of a school training." The essential distinction existing between school apprenticeship, of however strict a type, and trade apprenticeship, between the educational methods of the one and the economical working of the other, has always been recognised in France. Thus amongst the regulations of the year 1886 at the well-known École d'Apprentissage at Havre, before its conversion into an École Pratique d'Industrie, we find it expressly stated that "the purpose of the school is to form good apprentices and not to produce." The same principle holds good to a large extent even in Secondary Technical Education, and to it is due that over-elaboration and indifference to the element of time which was noted by the English Commission of 1881 as characteristic of the work at Châlons.

A system which aims at forming apprentices whose services are of immediate utility to the trade must necessarily include the principle of specialisation. On this question, as on that of apprenticeship itself, French views are marked by much greater clearness than was formerly the case. The Report of the Government Commission appointed in 1881 for the purpose of devising a scheme for a national technical school contained the recommendation that "all specialisation in Manual Instruction should be avoided." How this was practicable in a school like that at Vierzon, which was expressly intended as a training ground for special local industries, was not explained. At the present time specialisation is regarded as an essential feature in all Government Schools. To quote the programme of Vierzon "En 2^e année ils se spécialisent selon leur goût et leurs aptitudes." Each of the three National Schools comprises from five to seven distinct departments. At every school which prepares for trade apprenticeship, whether an École Pratique, École Nationale Professionnelle, or one of the Trade Schools of Paris, a short preparatory period, intended to give an insight into the trade as a whole, is

followed by a much longer period of special instruction. The length of this preliminary period varies. In the Écoles Pratiques, as in the Écoles Nationales Professionnelles, it is usually one year, at the Écoles Diderot, Palissy, Boule, and Estienne it varies from about two to six months. In the separate workshops of these schools each recognised subdivision of a trade finds its counterpart. The necessity of such a system, and the impossibility of teaching every department of a trade in its entirety to each apprentice is thus referred to in the programme of the École Estienne : “ Contrairement à ce que beaucoup se figurent, on ne fait pas à l'École des “ ouvriers connaissant *tous les métiers*, ce qui équivaudrait à dire qu'ils n'en “ connaîtraient aucun. Les enfants, c'est vrai, *voient* dans les cinq mois tous “ les ateliers, mais ensuite, ils sont uniquement ou compositeurs, ou imprimeurs, ou graveurs, ou lithographes, etc., pendant les trois ans et demi de “ leur séjour à l'École.”

In the types of school just referred to, a system of specialisation is inherent, and there can only be question of the degree and manner in which it is applied. Of the actual growth of this principle, on the other hand, of its recognised necessity under present industrial conditions, the best evidence is to be found in its recent adoption by one of the oldest and most conservative schools in France, which had up to that time expressly repudiated any connection with a system of apprenticeship or specialisation. The report of the Martinière Commission, of which a summary has been given, is chiefly interesting in so far as it raises, in a clear and trenchant manner, a direct issue between two fundamentally distinct systems of technical instruction : a theoretical and scientific training on the one hand, and a direct preparation for a definite trade on the other ; “ Enseignement professionnel général ” versus “ Enseignement véritablement professionnel.” With the adoption of the principle of specialisation by the Martinière the most important stronghold of a system of generalisation in French primary technical instruction may be said to have fallen.

If we turn for a moment to draw a brief comparison between French primary technical instruction and its equivalent in our own country, we find that, outwardly at least, the contrasts presented by the two systems are far greater than the analogies. While the French system is based on the generally recognised fact that trade apprenticeship, in the older sense of the term, is extinct, our own system may be said to rest on the supremacy of the trade shop, on its complete sufficiency, when combined with a modicum of subsidiary instruction, to meet the industrial needs of the country. Whereas in the one case we have a deliberate policy of definite trade teaching and a specially adapted scholastic organisation recognising the two principles of conjoint theory and practice and of specialisation, we have on the other hand an express prohibition of instruction in trade methods and a course of training which, when based on a school system, is chiefly theoretical and scientific, and where of a practical nature, is merely supplementary. Great as these distinctions undoubtedly are, we find, on closer inspection, that they are of degree rather than of kind, and indicative, not so much of a radical difference of system, as of separate stages of development. So far as school organisation is concerned we find a link between the two systems in the fact that the general attitude of our higher grade technical school of to-day is very much that of the École Professionnelle of 15 or 20 years ago. The designation of École professionnelle générale by which Mr. Lang described one of the best of these schools, the Martinière, in 1883, would apply equally to our own schools. Of the latter, as of the Martinière, it might be said : “ Dans une pareille école, “ les élèves doivent recevoir, outre un supplément indispensable d'instruction “ primaire, un ensemble de connaissances spéciales, particulièrement en dessin, “ en sciences et en comptabilité, qui les rende capables de réussir dans une

“ profession quelconque, industrielle, commerciale, ou même artistique, où les “ porteront leurs aptitudes.” Even in the term “ Enseignement professionnel,” we find, if we accept Mr. Lang’s interpretation of it, much that corresponds to our present conception of “ Technical instruction ”: “ L’enseignement spécial “ ainsi entendu n’est pas un enseignement professionnel, si l’on n’applique ce “ mot ‘ professionnel ’ qu’à l’apprentissage manuel de la profession. Il est, au “ contraire, professionnel au plus haut degré, si comme il nous semble juste, on “ appelle connaissances professionnelles les connaissances spéciales nécessaires, “ soit à l’ouvrier, soit au contre-maitre, pour l’exercice intelligent de sa “ profession.” Mr. Lang’s views, to some extent modified by his subsequent proposal to specialise the instruction of the Martinière in a fourth year to be added to the course, are, as we have seen, no longer representative. To our schools, as to the Martinière, would apply the criticism of the Administrative Commission of 1895. “ Cet enseignement peut, à la rigueur et en raison de “ ses programmes scientifiques, être qualifié d’enseignement professionnel “ général, mais en réalité il est bien plus général que professionnel. Il se “ contente de donner aux jeunes gens les moyens d’aborder indifféremment “ toutes les professions : il ne les forme pas pratiquement et positivement à “ l’exercice de ces professions.” Much might be said for and against the view here expressed. Its strength lies in the fact that it is in harmony with all the tendencies of modern industrial instruction. How far, it may fairly be asked, can a system be called really “ practical ” which does not give a distinct bias towards the exercise of a particular profession? And how can such a bias be given except through the decided preponderance of some one particular subject of instruction, in other words, by a system of specialisation? Is it not unreasonable to suppose that a boy, whose mind, so far as it has been influenced at all, has been impelled by elementary education towards some form of clerical work, should receive an entirely new impulse towards a practical trade or profession by what is virtually a mere continuation of such elementary education, slightly tinged with instruction in elementary science? It is somewhat difficult to imagine that a few hours of instruction during the week in manual work or in chemistry should create a predisposition in a boy’s mind to become a mechanic or a chemist. It would appear more probable that a predominantly “ literary ” education, combined with a slight knowledge of chemistry or physics, should, if anything, produce a leaning towards the life of a clerk or a school teacher. Even when considerable prominence is given to scientific instruction, it may be contended that, unless it is closely associated with some practical trade, its influence on the industries of a country can only be of an indirect and fortuitous nature.

While English primary and secondary technical instruction is still to a large extent supplementary, and is given through the medium of separate courses, whose inter-connection, where it exists, is necessarily partial and imperfect, French Enseignement professionnel, so far as it is regarded as of national importance, is based on the systematic organisation of a school. In France, as in England, classes on technical subjects cover a wide and varied field of usefulness. At one of the two great technical societies of Paris, the Association Polytechnique, the number of distinct courses is about 575, while the attendances amount to over 11,000 a week. At the classes held by the Association Philotechnique, amongst over 500 classes, the average weekly attendances exceed 7,000. At Lyons over 5,000 names are entered every year for the classes which, to the number of about 140, are provided by the Société d’Enseignement Professionnel du Rhône. While such instruction, in view of the public benefits which it confers, is much appreciated, technical authorities in France are fully alive to its practical limitations. Intended as it is principally for adults, it is regarded rather as a remedy for neglected education, than an

education itself. It is the left, not the right, hand of industrial instruction. It is hardly necessary to insist on the essential distinction between a disconnected, or imperfectly connected, system of supplementary class work and the regular homogeneous and prolonged instruction of a school. It is a distinction, however, which in England is not unfrequently obscured by the loose way in which the word "school" is applied to places of technical instruction which have few of the essential characteristics properly connoted by the term. Amongst such characteristics we may include examinations both on entrance and at periodical intervals, a graduated course of instruction, obligatory on all, and extending over at least three years, and the practice of making the award of certificates conditional on an attendance at the school for at least two years.

In view of the national interests at stake it appears to be a matter of real importance that we should draw a clear distinction between the results which we may reasonably expect to derive from a supplementary training on the one hand, and a scholastic system on the other. It appears to be hardly sufficiently recognised that the mere multiplication of subjects and classes does not constitute a school, and is not, in itself, a criterion of efficiency. It may be noted as one of the inherent weaknesses of a supplementary organisation, more especially when such organisation is part of the accepted machinery of a national system of industrial education, that it is so largely dependent on the element of popularity. The importance attached to the mere numbers of those to whom the instruction of some particular institution has, in however fleeting and transient a form, been dispensed, is in marked contrast to the indifference displayed to actual length and continuity of training in the case of individual students. It must be evident that the mere fact of a boy having attended a particular place of instruction is in itself of very little importance in comparison with the question how long he has been there, and whether, under the most favourable circumstances, it has been possible for him to acquire any knowledge of a useful character.

As a further trait, natural to a system of supplemental instruction, may be noted a defective sense of proportion, a tendency to regard the industrial world in the light of an oriental bazaar, in which every trade and craft is represented, but where none has any preference over the other. It is in harmony with such a conception that ironmongery and dressmaking, plumbing and bee-keeping, carpentry and cookery are mentioned in the same breath, and that instruction in one or all of these subjects are "provided" with equal impartiality. A scholastic system, on the other hand, regards certain forms of industrial activity as standing, in virtue of the wideness of their scope, and the diversity of their application, in a position of unquestioned pre-eminence. These it cultivates and fosters by organised methods, viewing them as the main arteries through which the industrial life of the country flows. If there is any drawback to the enormous increase of supplemental technical instruction in this country, it would appear to consist in the fact that the very display of so much energy may blind us to the truth that such instruction, however extended, can, from an international point of view, as an equipment against foreign competition in trade, never replace the solid advantages of a regular and systematic school training any more than university extension lectures can replace the universities or the volunteer movement the regular army.

The scant favour with which the principle of apprenticeship schools is regarded in England may be said to be due to reasons partly of a practical, and partly of an educational, order. It is said, on the one hand, that practical work can only be learnt in the trade shop, and on the other, that the mechanical drudgery which this type of school involves is contrary to the true spirit of

education. In view of the recent development and improvement of such schools in France, these views appear to need some modification. The question whether the highest form of practical skill can only be learnt in the trade shop must depend on the actual state of apprenticeship. If this is extinct, as is for instance said to be the case in our building trades, the shop can hardly be said to be any longer a school of practical workmanship. French schools do not, as has been shown, profess to supersede the shop, but it may be claimed for them that they not only tend to maintain the highest standard in the methods of workshop practice, but that they have a powerful influence in improving these methods themselves, inasmuch as the work of a school apprenticeship is conducted, not by rule of thumb, or mere tradition, but in the light of the best and latest scientific principles. In instituting the *Écoles Pratiques* the French authorities have been inspired by a conviction that it is for the interest of the country that not only foremen and managers of works, but artisans as a class, should pass through a systematic course of school training. The importance attached to the formation of a distinct body of picked workmen is further shown by the recent institution of the school at Cluny for candidates whose mathematical and scientific knowledge is unequal to the demands of the *Écoles d'Arts et Métiers*. In England, though workmen have many places of supplementary instruction open to them, they have little or no opportunity of a complete industrial education. So far as the question of general education is concerned, it is a striking fact that the time devoted at Voiron, one of the *Écoles Nationales Professionnelles*, in which the principle of apprenticeship has been shown to be recognised, to purely literary subjects, is actually greater than that given to the same purpose by an English technical school like the People's Palace Day School.

It can hardly be doubted that our present attitude towards the whole question of industrial education is a somewhat illogical one. While in theory we forbid the employment of public money for trade instruction in schools, such money is, in practice, spent by municipal bodies for the support of trade classes and institutions restricted to the use of trade apprentices. If the history of the recent progress in French technical instruction has any lesson to teach, it would appear to be that the time has arrived for us also to adopt a bolder and more consistent policy as regards industrial education, and by giving greater prominence to practical, special, and scholastic, as opposed to theoretical, scientific, and supplemental requirements, to render our system of technical instruction, so far as it is intended to help us to meet foreign trade competition, "*un enseignement véritablement professionnel.*"

In concluding this report, I beg to tender my sincere thanks to the French Minister of Commerce and Industry for the authorisation which has given me access to the technical schools under his control. I desire, at the same time, most cordially to thank all those directors who have so kindly permitted me to inspect the institutions over which they preside, and have given me their views on questions of technical education.

CHARLES COPLAND PERRY.



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